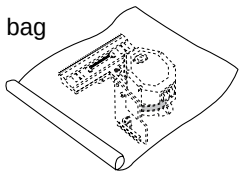
SERVICING PRECAUTIONS

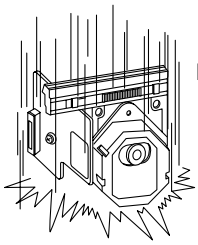
NOTES REGARDING HANDLING OF THE PICK-UP

1. Notes for transport and storage

1) The pick-up should always be left in its conductive bag until immediately prior to use.
2) The pick-up should never be subjected to external pressure or impact.

Storage in conductive bag

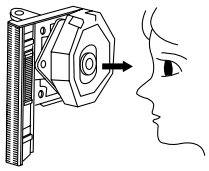




Drop impact

2. Repair notes

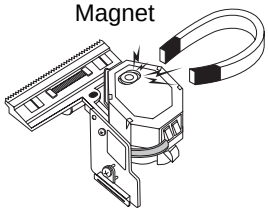
1) The pick-up incorporates a strong magnet, and so should never be brought close to magnetic materials.
2) The pick-up should always be handled correctly and carefully, taking care to avoid external pressure and impact. If it is subjected to strong pressure or impact, the result may be an operational malfunction and/or damage to the printed-circuit board.
3) Each and every pick-up is already individually adjusted to a high degree of precision, and for that reason the adjustment point and installation
screws should absolutely never be touched.
4) Laser beams may damage the eyes!
Absolutely never permit laser beams to enter the eyes!
Also NEVER switch ON the power to the laser output part (lens, etc.) of the pick-up if it is damaged.

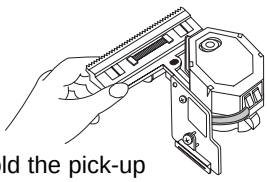


NEVER look directly at the laser beam, and don't let contact fingers or other exposed skin.

5) Cleaning the lens surface
If there is dust on the lens surface, the dust should be cleaned away by using an air bush (such as used for camera lens). The lens is held by a delicate spring. When cleaning the lens surface, therefore, a cotton swab should be used, taking care not to distort this.

Magnet

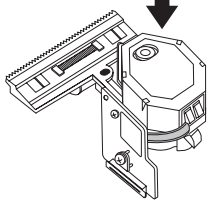


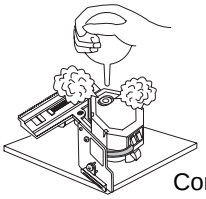


How to hold the pick-up

Pressure

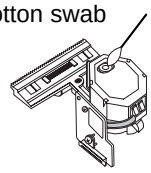
Pressure





Conductive Sheet

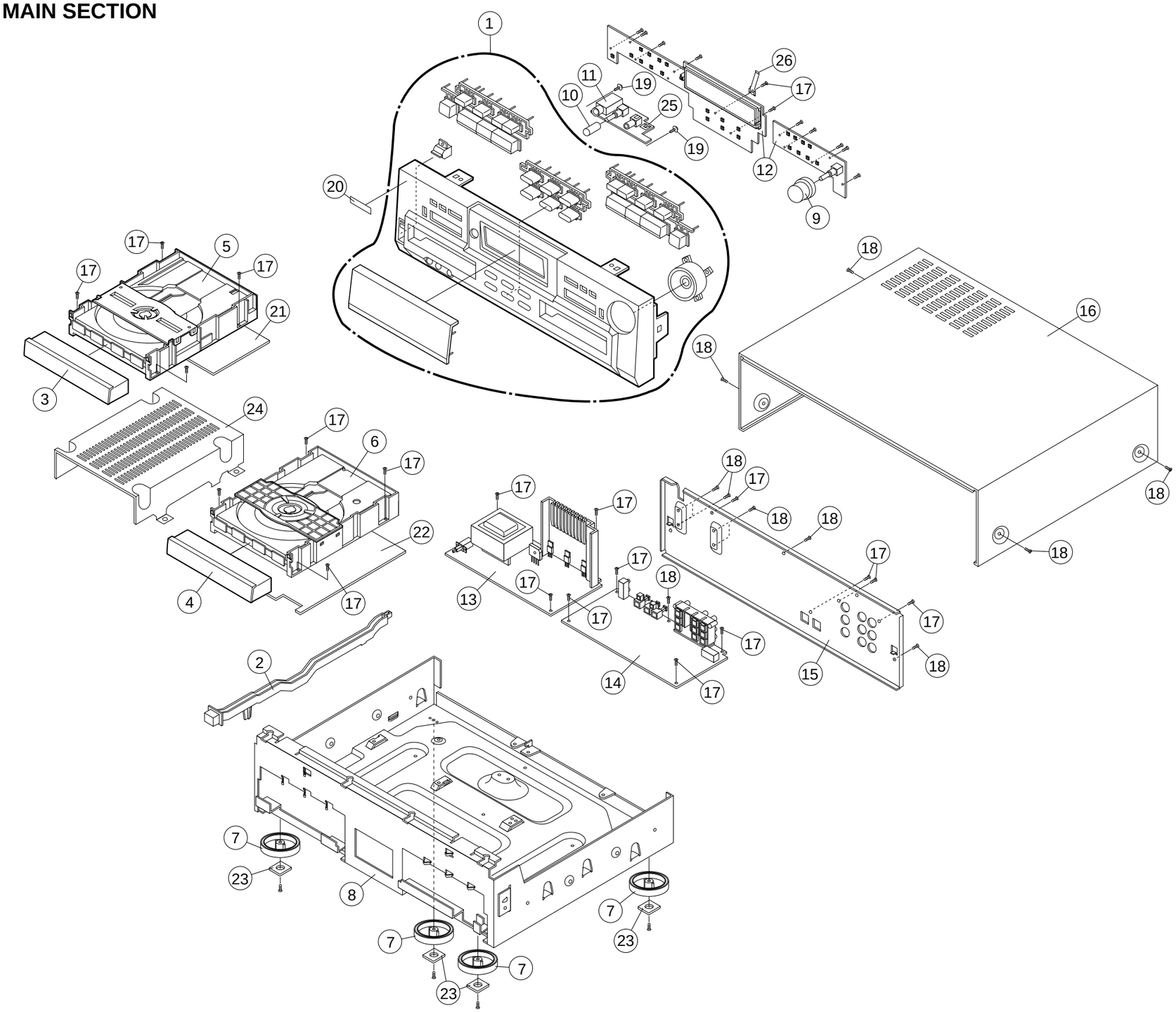
Cotton swab



6) Never attempt to disassemble the pick-up.
Spring by excess pressure. If the lens is extremely dirty, apply isopropyl alcohol to the cotton swab. (Do not use any other liquid cleaners, because they will damage the lens.) Take care not to use too much of this alcohol on the swab, and do not allow the alcohol to get inside the pick-up.

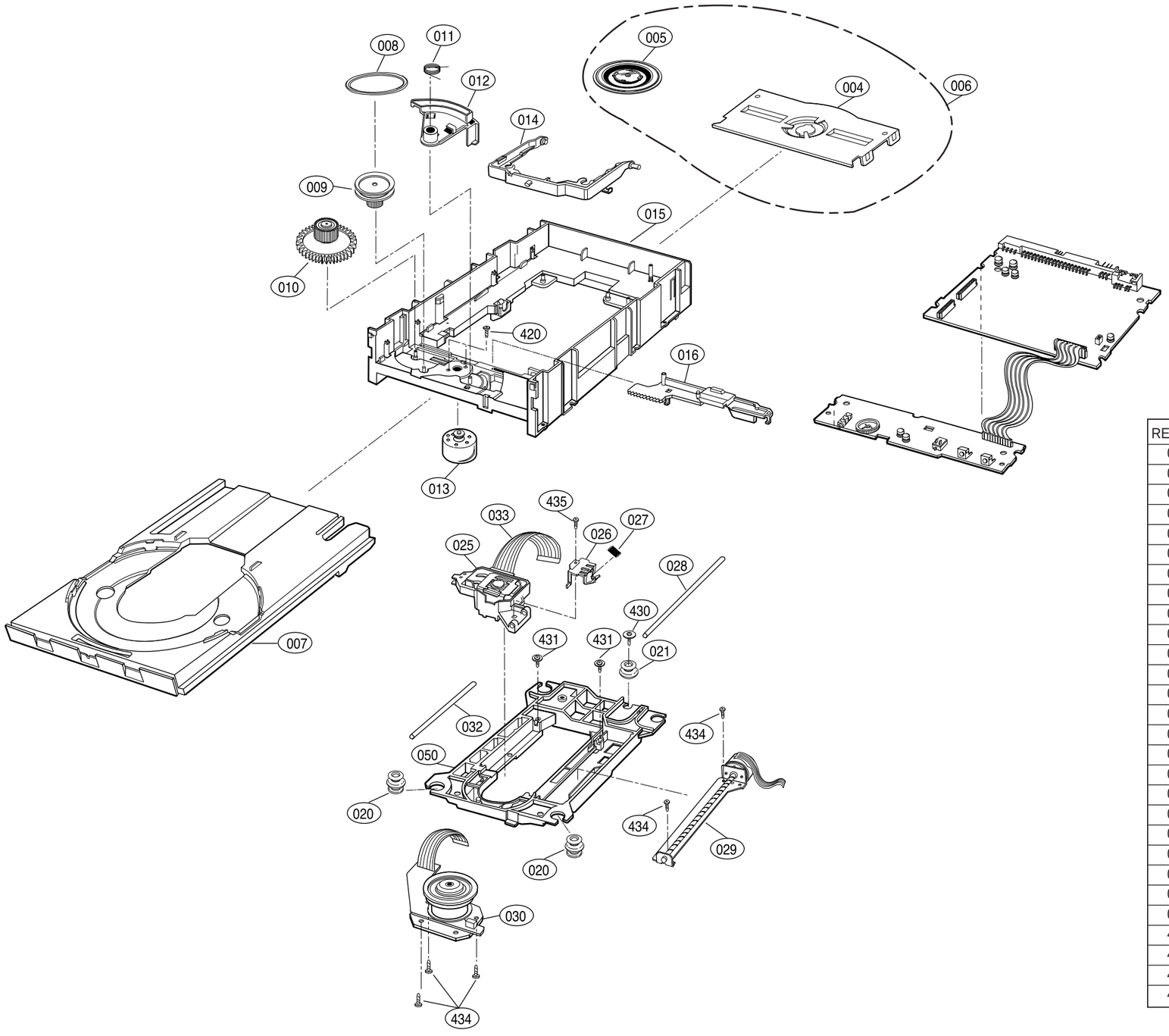
EXPLODED VIEW

• MAIN SECTION



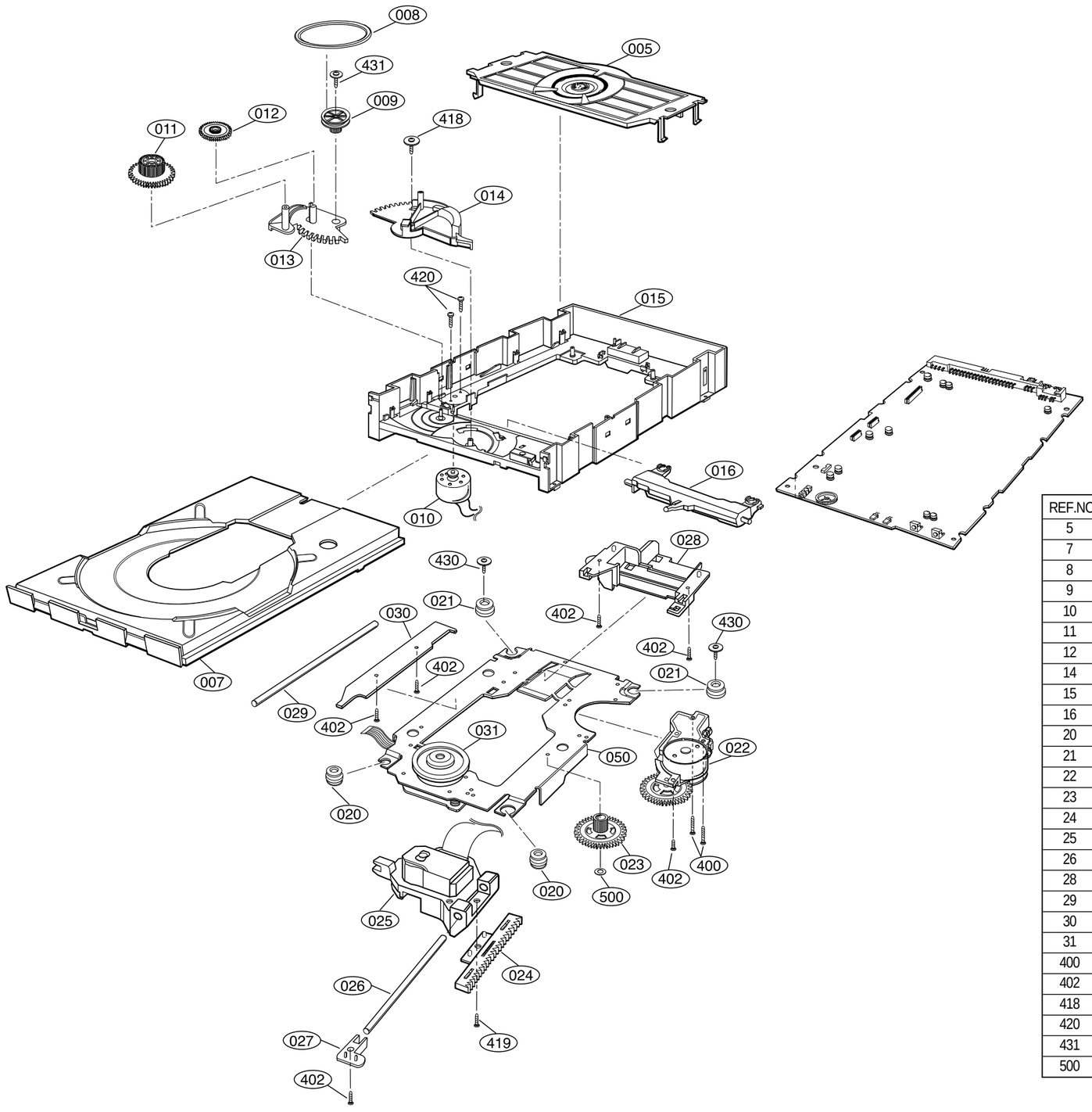
REF.NO.	PART NO	DESCRIPTION
1	3721R-M005A	PANEL FRONT A'Y
2	4940R-P004A	KNOB. POWER
3	3580R-T007A	DOOR PLAY
4	3580R-T007B	DOOR REC
5	6721R-0301A	MECHA Q1(PLAYER)
6	4405H-1068C	MECHA E2
7	3610S-0192C	FOOT BOTTOM
8	3141R-0012A	CHASSIS MAIN
9	4940R-V009A	KNOB REC
10	4940S-6941A	KNOB VOLUME
11	6871RJ1963A	PCB ASSY HEADPHONE
12	6871SF42GAA	PCB ASSY FL/KEY
13	6871RP42NAA	PCB ASSY POWER
14	6871S-429AB	PCB ASSY IO
15	3720S-P014D	PANEL BACK
16	3140S-P911C	CHASSIS TOP
17	353-046K	SCREW(M3)
18	353-633A	SCREW(M4)
19	353-051AAAA	SCREW(M3)
20	3300R-0209A	MARK BADGE
21	6871S-423AB	PCB PLAY
22	6871S-42QAA	PCB REC
23	4766R-0003A	FELT FOOT
24	3550S-1027B	COVER-RW DECK
25	3300R-M011A	PLATE GND
26	3300R-0211A	PLATE TIMER GND

• CD PLAY SECTION



REF.NO.	PART NO	DESCRIPTION
004	4930H-1061A	HOLDER CLAMP
005	4861R-0004A	CLAMP ASSY Q1 & E2 ACDR
006	4931R-0033A	HOLDER ASSY CLAMP(Q1, ACDR)
007	3390H-1016C	TRAY DISC, BLACK
008	4400H-1009A	BELT GM-RT 1332A
009	4560H-1015A	PULLEY GEAR(GM-R512)
010	4470H-1115A	GEAR LOADING(Q1)
011	4970H-1087A	SPRING LEVER SWITCH
012	4510H-1033A	LEVER SWITCH(Q1)
013	4681H-1024A	MOTOR ASSY LOADING
014	3040H-1056A	BASE UP/DOWN(Q1)
015	3040H-1055A	BASE MAIN(Q1)
016	4974H-1034A	GUIDE UP/DOWN(Q1)
020	5040H-1053A	RUBBER GM-RT1332A(F)
021	5040H-1052A	RUBBER GM-RT1332A(R)
025	6716S-E001A	PICK UP SF-P151EXVA SANYO ACDR
026	4974H-1039A	GUIDE FEED
027	4970H-1086A	SPRING FEED
028	4370H-1024C	SHAFT P/U(R)
029	4680HP5002B	MOTOR 15S1R10F6NC3 MATSUSHITA STEPPI
030	4680HB1019A	MOTOR GCS-L32A LGEC SPINDLE
032	4370H-1025B	SHAFT P/U(L)
033	6850HD1L16A	CABLE, FLEXIBLE 2896-A-1.0-17(05*65)160 BANDO
050	3040H-1057A	BASE P/U(Q1)
420	4000H-1006B	SCREW + D1.7 4.5MM SWRCH16A/ZNY 4MM
431	1SZZH-1004A	SCREW + D1.7 5MM SWRCH16A/ZNY 3.5MM
434	1SZZH-1007B	SCREW + D2.0 6MM SWRCH16A/ZNBK 4MM 1
435	1SZZH-1011B	SCREW + D1.7 6MM SWRCH16A/NIY 3.5MM

• CD RECORD SECTION



REF.NO.	PART NO	DESCRIPTION
5	4861H-0008A	CLAMP ASSY ACDR
7	3390H-1011D	TRAY DISC
8	4400H-1003A	BELT ACDR
9	4560H-1004A	PULLEY GEAR
10	4681H-1024A	MOTOR ASSY LOADING
11	4470H-1015A	GEAR LOADING
12	4470H-1016A	GEAR MIDDLE
14	3040H-1059A	BASE UP/DOWN
15	3040H-1035B	BASE MAIN
16	4974H-1023A	GUIDE UP/DOWN
20	5040H-1055A	RUBBER FRONT
21	5040H-1054A	RUBBER REAR
22	4680HP4001A	MOTOR(MECH) RF-300PA-11400 MABUCHI
23	4470H-1123A	GEAR PINION(U)
24	4470H-1121A	GEAR RACK(B)
25	6716HSW201A	PICK UP KRS-200A SONY
26	4370H-1079A	SHAFT P/U(R)
28	4930H-1063A	HOLDER FFC
29	4370H-1078A	SHAFT P/U(L)
30	4810H-1042A	BRACKET WEIGHT BALANCER
31	4680HB 1025A	MOTOR(MECH) SPINDLE GRS-R01A LGC&D
400	1SZZH-1005A	SCREW D1.7 5MM SWRCH16A/NIY
402	1SZZH-1020C	SCREW D2. 0 4.5MM SWRCH16A/ZNY
418	1SZZH-1011A	SCREW D1. 7 7MM SWRCH16A/ZNY
420	4000H-1006A	SCREW D1. 7 4MM SWRCH16A/ZNBK
431	1SZZH-1004A	SCREW D1. 7 5MM SWRCH16A/ZNY
500	1WZZH-1009A	WASHER BLACK Y POLY N

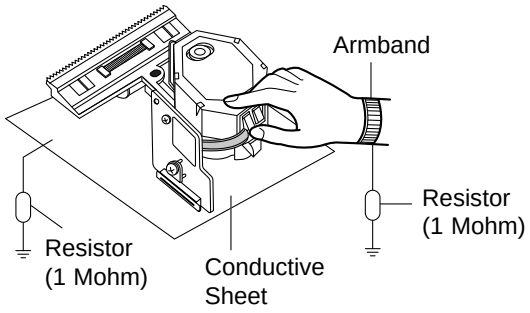
NOTES REGARDING COMPACT DISC PLAYER REPAIRS

1. Preparations

1) Compact disc players incorporate a great many ICs as well as the pick-up (laser diode). These components are sensitive to, and easily affected by, static electricity. If such static electricity is high voltage, components can be damaged, and for that reason components should be handled with care.
2) The pick-up is composed of many optical components and other high-precision components. Care must be taken, therefore, to avoid repair or storage where the temperature of humidity is high, where strong magnetism is present, or where there is excessive dust.

2. Notes for repair

1) Before replacing a component part, first disconnect the power supply lead wire from the unit
2) All equipment, measuring instruments and tools must be grounded.
3) The workbench should be covered with a conductive sheet and grounded.
   When removing the laser pick-up from its conductive bag, do not place the pick-up on the bag. (This is because there is the possibility of damage by static electricity.)
4) To prevent AC leakage, the metal part of the soldering iron should be grounded.
5) Workers should be grounded by an armband (1MΩ)
6) Care should be taken not to permit the laser pick-up to come in contact with clothing, in order to prevent static electricity changes in the clothing to escape from the armband.
7) The laser beam from the pick-up should NEVER be directly facing the eyes or bare skin.



ESD PRECAUTIONS

Electrostatically Sensitive Devices (ESD)

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

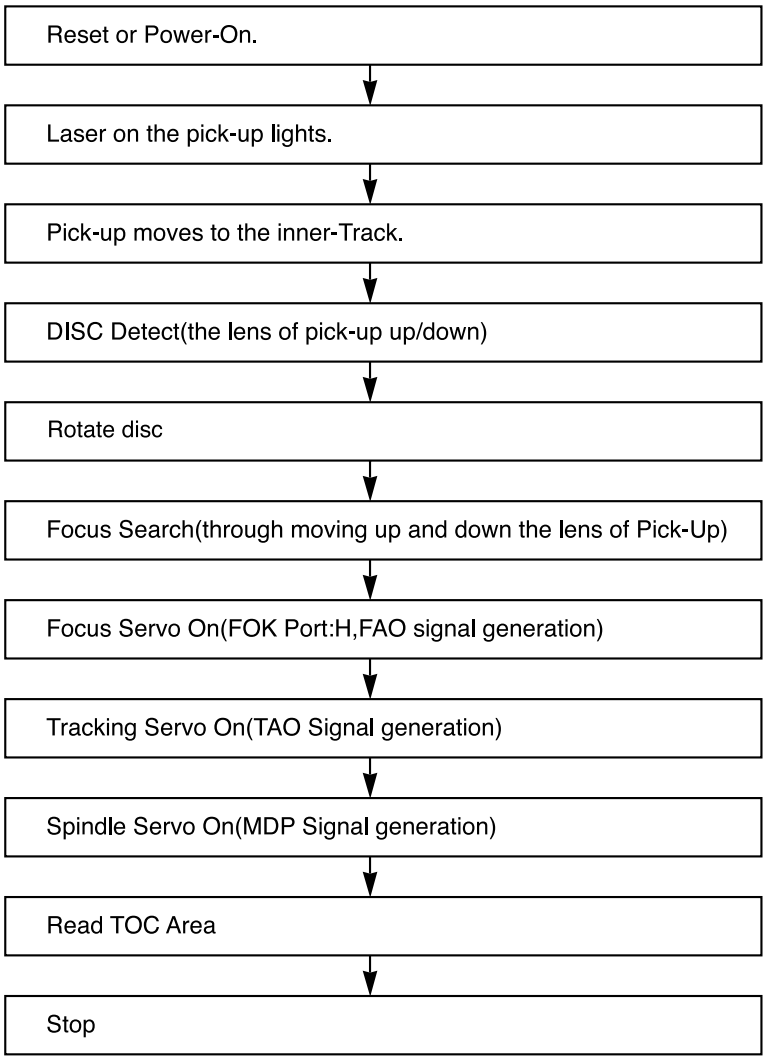
1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ESD devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
6. Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).
7. Immediately before removing the protective material from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will by installed.

CAUTION : BE SURE NO POWER IS APPLIED TO THE CHASSIS OR CIRCUIT, AND OBSERVE ALL OTHER SAFETY PRECAUTIONS.

8. Minimize bodily motions when handing unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

TROUBLESHOOTING GUIDE

1. Initial Lead-in Operation

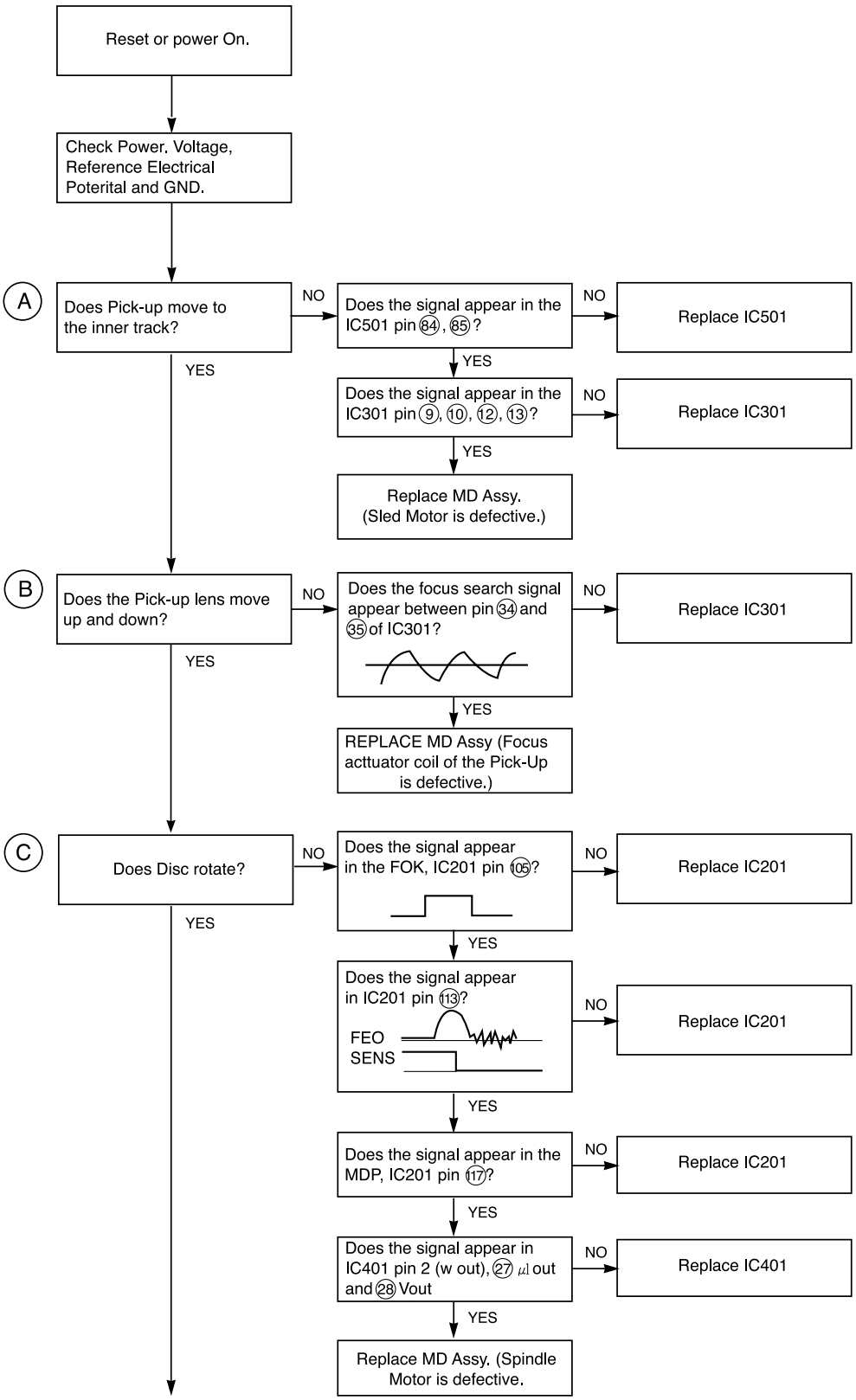

Reset or Power-On.
Laser on the pick-up lights.
Pick-up moves to the inner-Track.
DISC Detect(the lens of pick-up up/down)
Rotate disc
Focus Search(through moving up and down the lens of Pick-Up)
Focus Servo On(FOK Port:H,FAO signal generation)
Tracking Servo On(TAO Signal generation)
Spindle Servo On(MDP Signal generation)
Read TOC Area
Stop

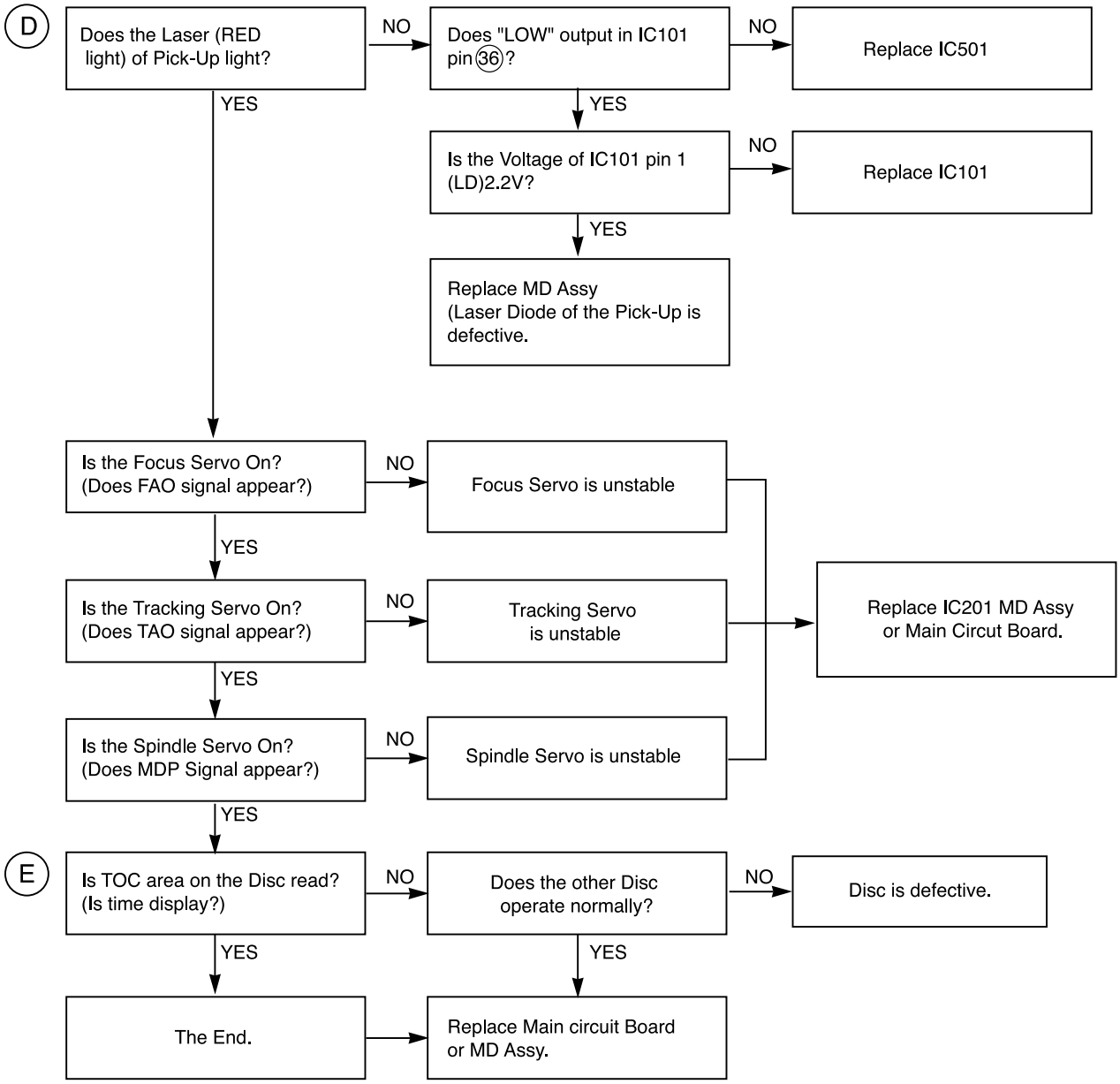
2. Trouble List(Circuit)

(In the Initial Lead-in Operation Mode)

A. Pick-Up doesn't move to the inner-track.
B. Pick-Up lens doesn't move up and down.
C. Disc doesn't rotate.
D. The Laser(RED) of Pick-Up doesn't light.
E. TOC isn't read.

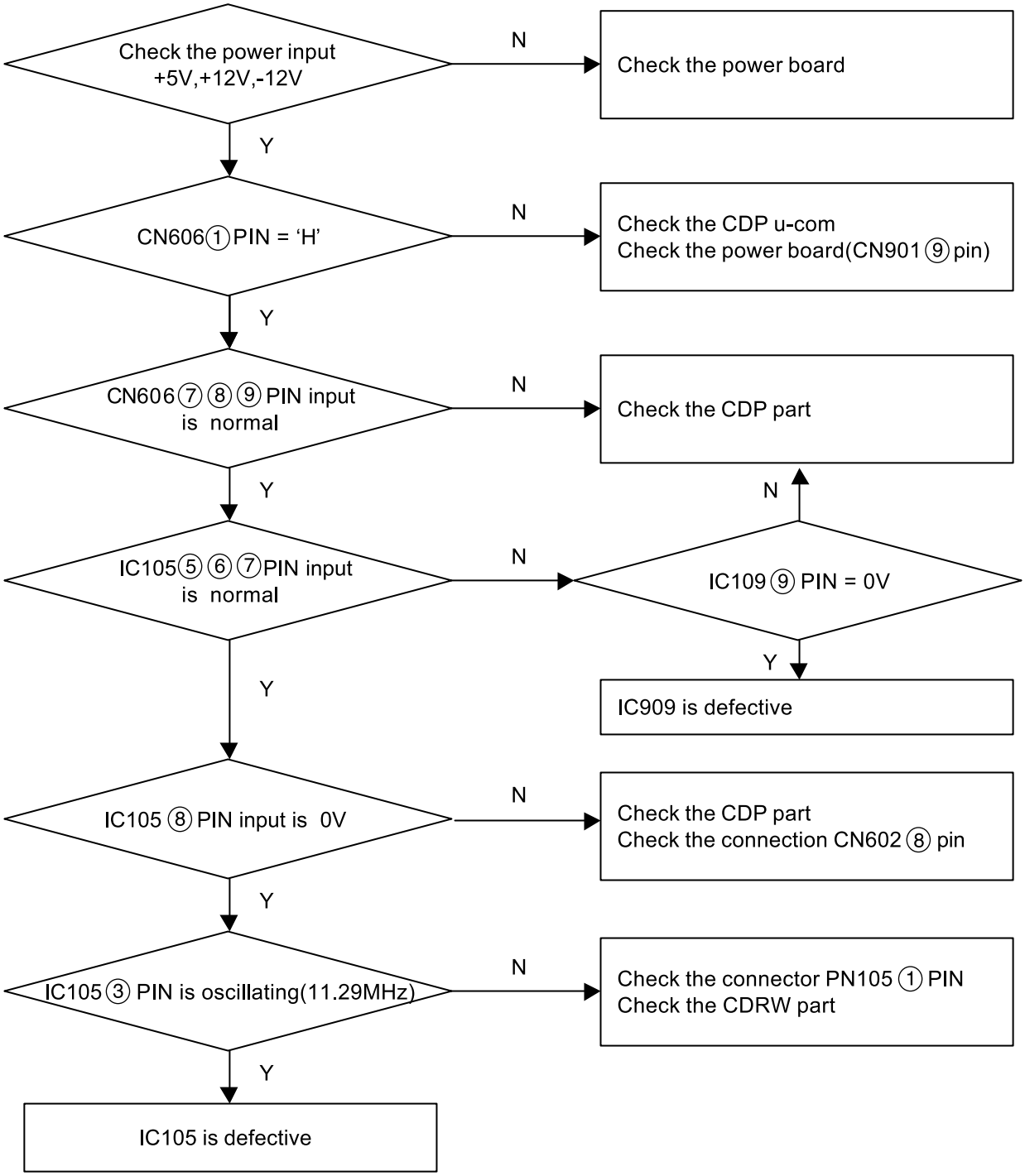
3. Troubleshooting Guide(In the Initial Lead-in Operation Mode)




D
Does the Laser (RED light) of Pick-Up light?
NO
Does "LOW" output in IC101 pin 36?
NO
Replace IC501
YES
YES
Is the Voltage of IC101 pin 1 (LD)2.2V?
NO
Replace IC101
YES
Replace MD Assy (Laser Diode of the Pick-Up is defective.
Is the Focus Servo On? (Does FAO signal appear?)
NO
Focus Servo is unstable
YES
Is the Tracking Servo On? (Does TAO signal appear?)
NO
Tracking Servo is unstable
Replace IC201 MD Assy or Main Circut Board.
YES
Is the Spindle Servo On? (Does MDP Signal appear?)
NO
Spindle Servo is unstable
YES
E
Is TOC area on the Disc read? (Is time display?)
NO
Does the other Disc operate normally?
NO
Disc is defective.
YES
YES
The End.
Replace Main circuit Board or MD Assy.

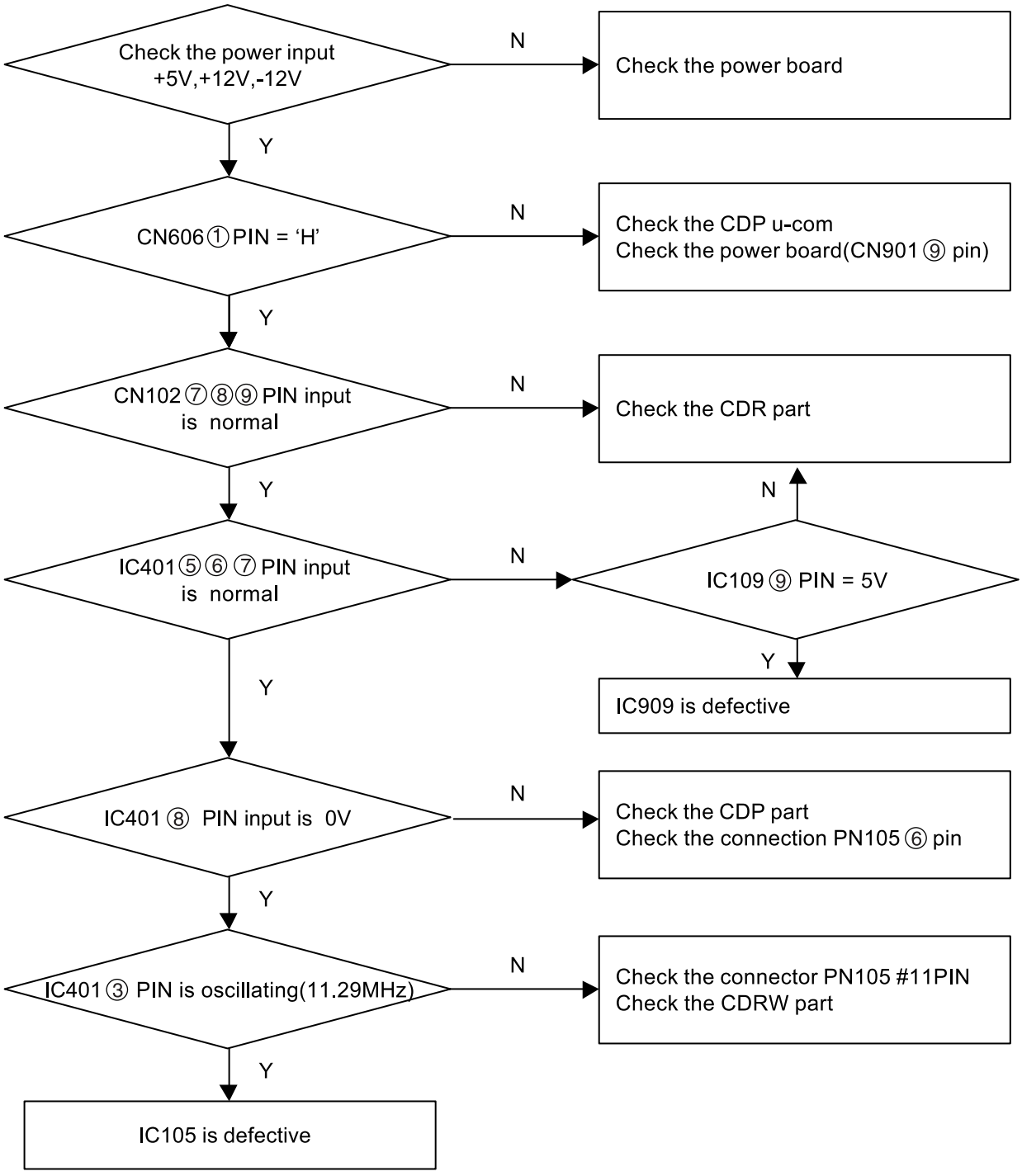
NO AUDIO(CDP JACK)

CURRENT DECK IS CDP

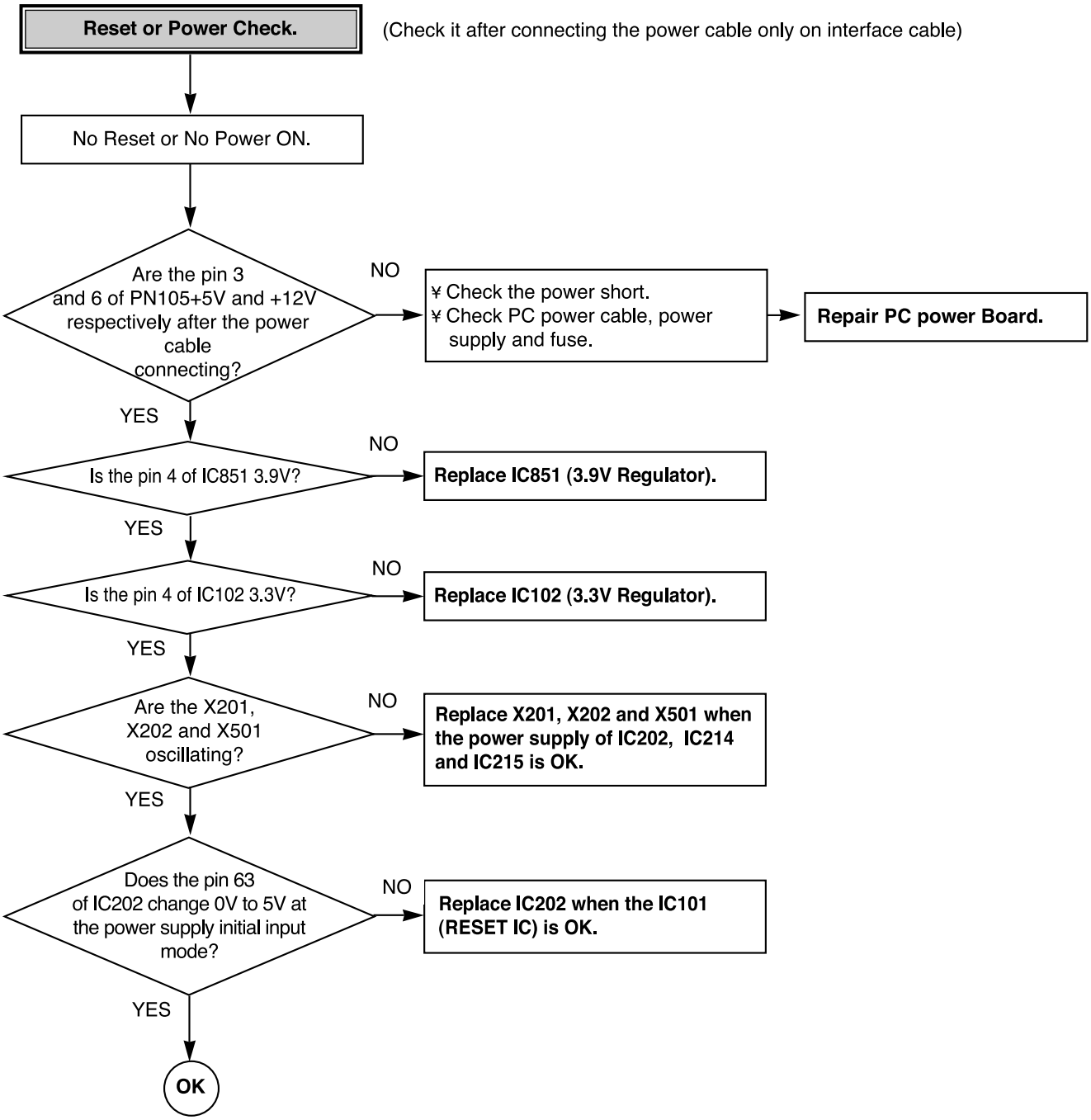


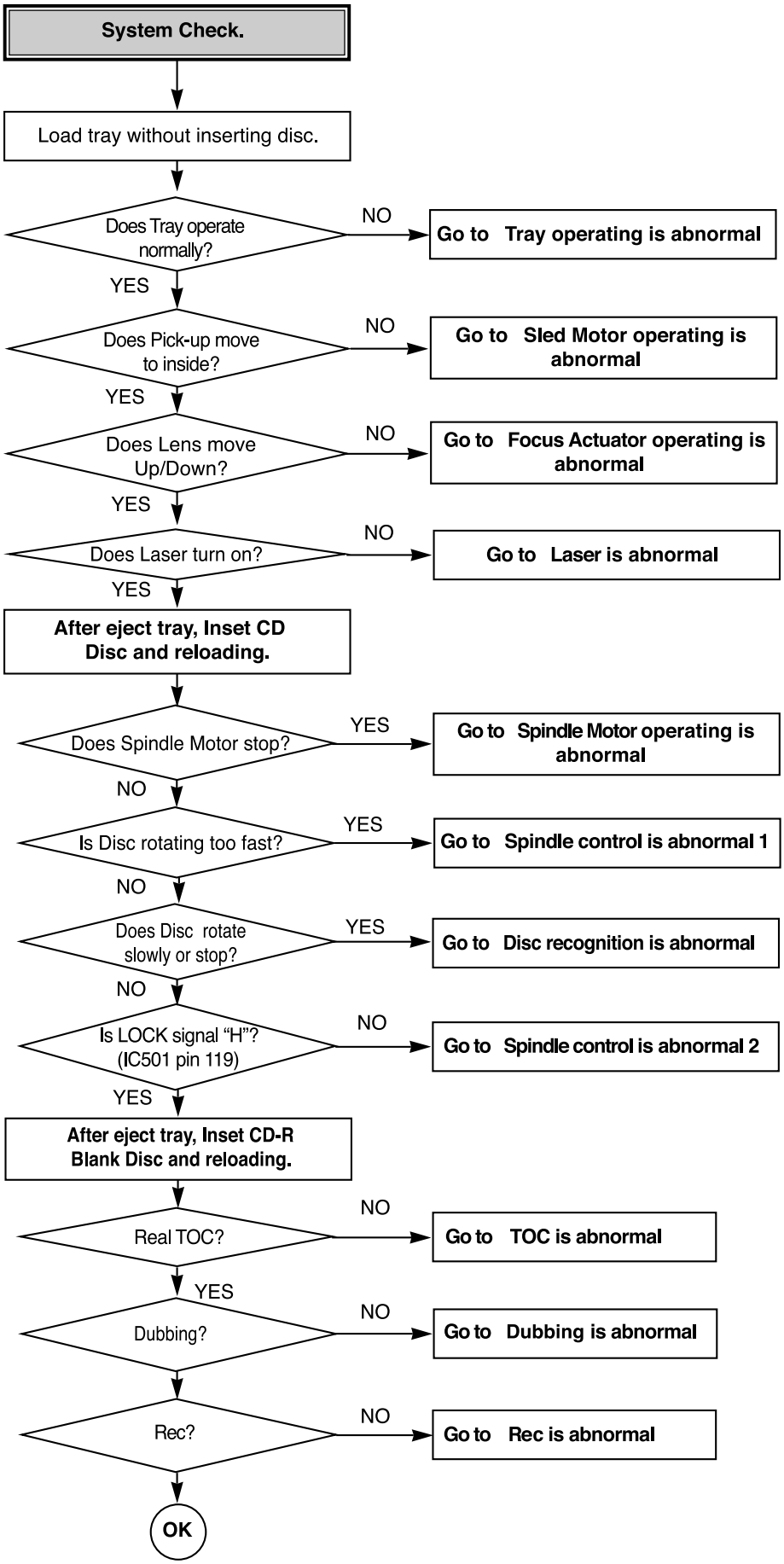
NO AUDIO(CDP JACK)

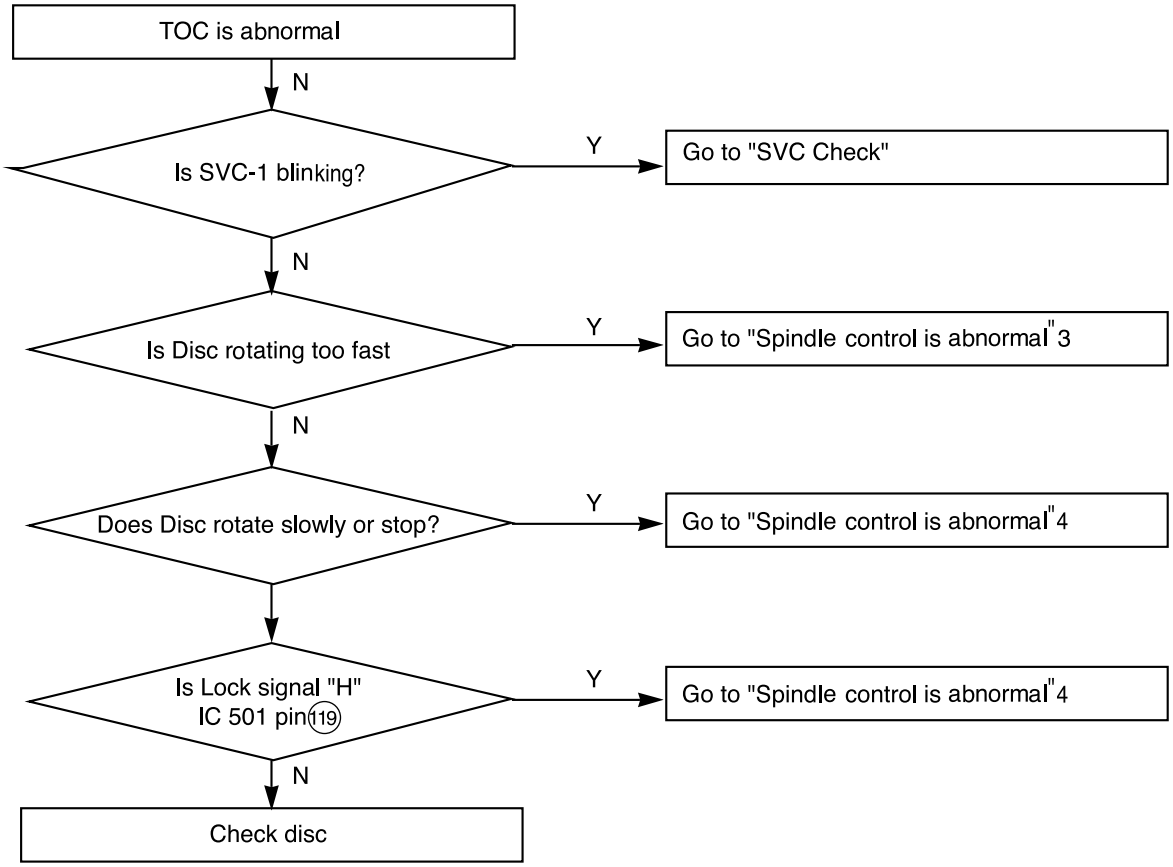
CURRENT DECK IS CDR

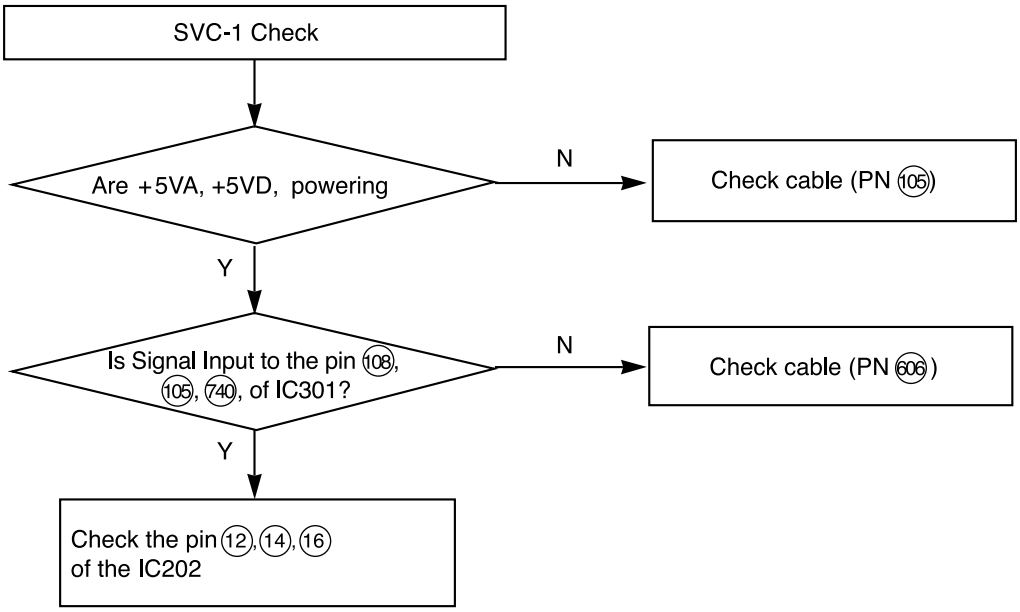


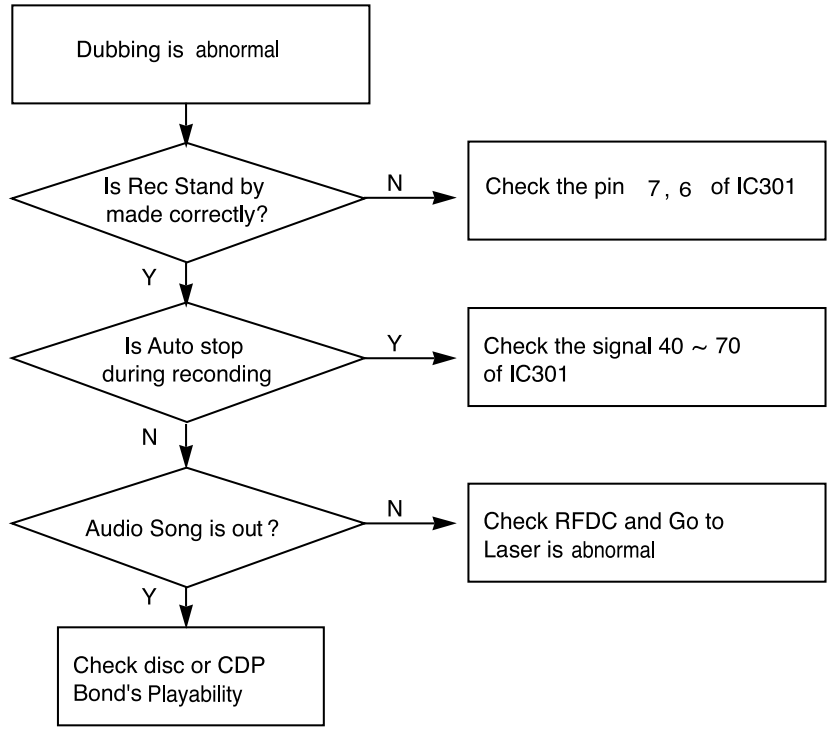
TROUBLESHOOTING GUIDE FOR CD-RW BOARD

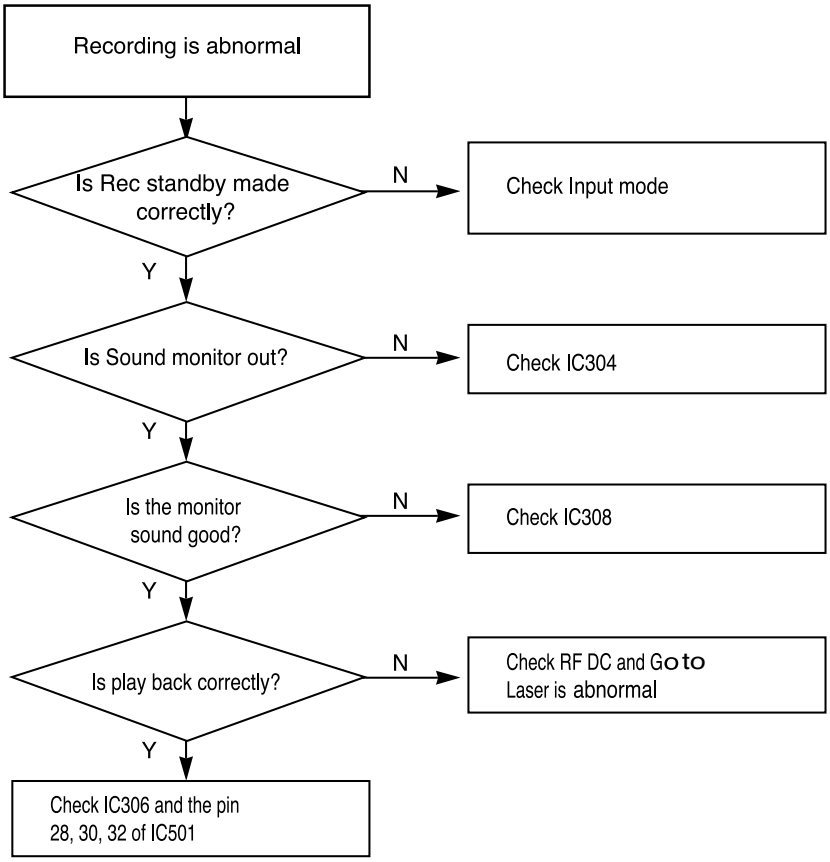

Reset or Power Check.
(Check it after connecting the power cable only on interface cable)
No Reset or No Power ON.
Are the pin 3 and 6 of PN105+5V and +12V respectively after the power cable connecting?
NO
¥ Check the power short.
¥ Check PC power cable, power supply and fuse.
Repair PC power Board.
YES
Is the pin 4 of IC851 3.9V?
NO
Replace IC851 (3.9V Regulator).
YES
Is the pin 4 of IC102 3.3V?
NO
Replace IC102 (3.3V Regulator).
YES
Are the X201, X202 and X501 oscillating?
NO
Replace X201, X202 and X501 when the power supply of IC202, IC214 and IC215 is OK.
YES
Does the pin 63 of IC202 change 0V to 5V at the power supply initial input mode?
NO
Replace IC202 when the IC101 (RESET IC) is OK.
YES
OK

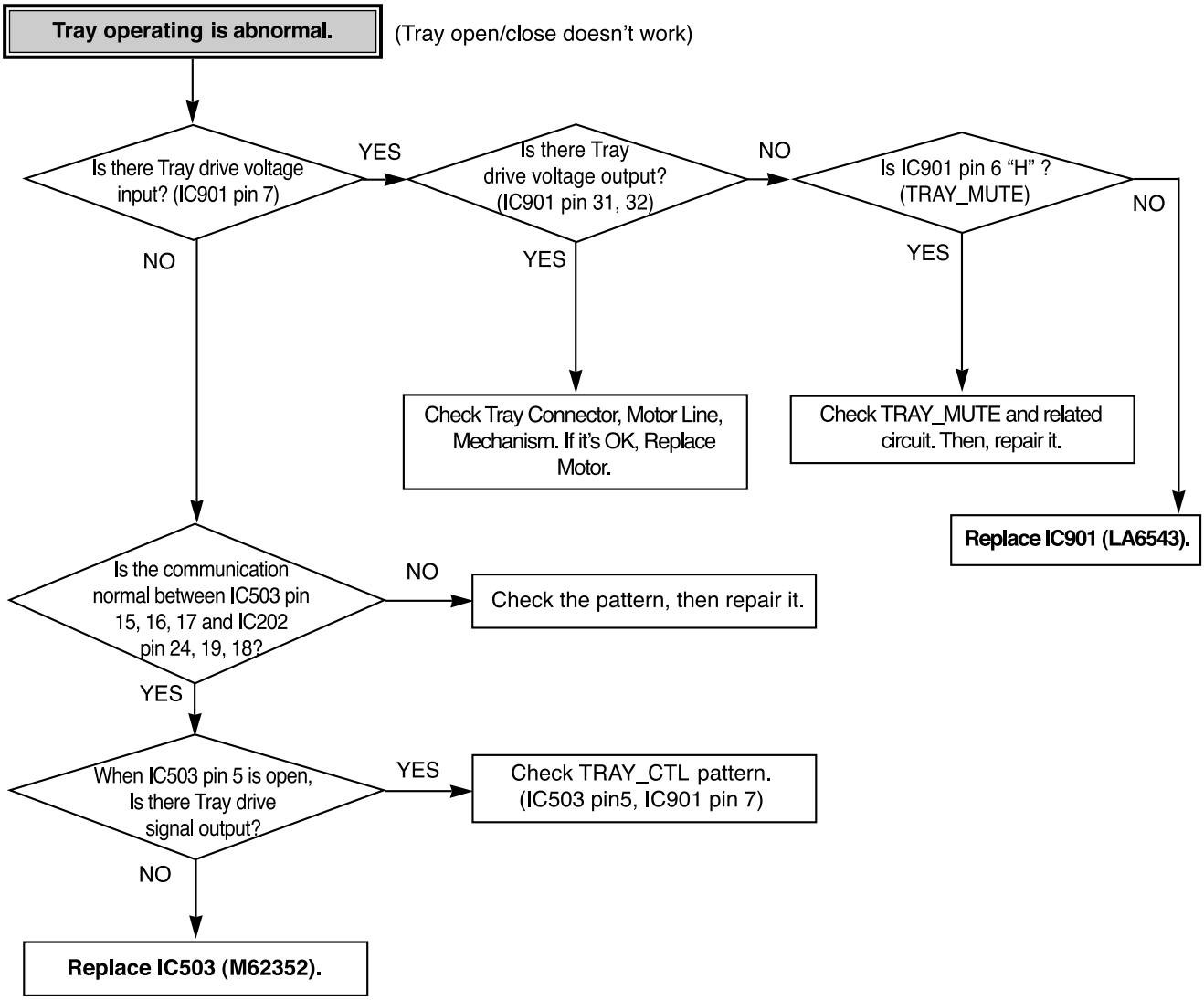

System Check.
Load tray without inserting disc.
Does Tray operate normally?
NO
Go to Tray operating is abnormal
YES
Does Pick-up move to inside?
NO
Go to Sled Motor operating is abnormal
YES
Does Lens move Up/Down?
NO
Go to Focus Actuator operating is abnormal
YES
Does Laser turn on?
NO
Go to Laser is abnormal
YES
After eject tray, Inset CD Disc and reloading.
Does Spindle Motor stop?
YES
Go to Spindle Motor operating is abnormal
NO
Is Disc rotating too fast?
YES
Go to Spindle control is abnormal 1
NO
Does Disc rotate slowly or stop?
YES
Go to Disc recognition is abnormal
NO
Is LOCK signal "H"? (IC501 pin 119)
NO
Go to Spindle control is abnormal 2
YES
After eject tray, Inset CD-R Blank Disc and reloading.
Real TOC?
NO
Go to TOC is abnormal
YES
Dubbing?
NO
Go to Dubbing is abnormal
Rec?
NO
Go to Rec is abnormal
OK

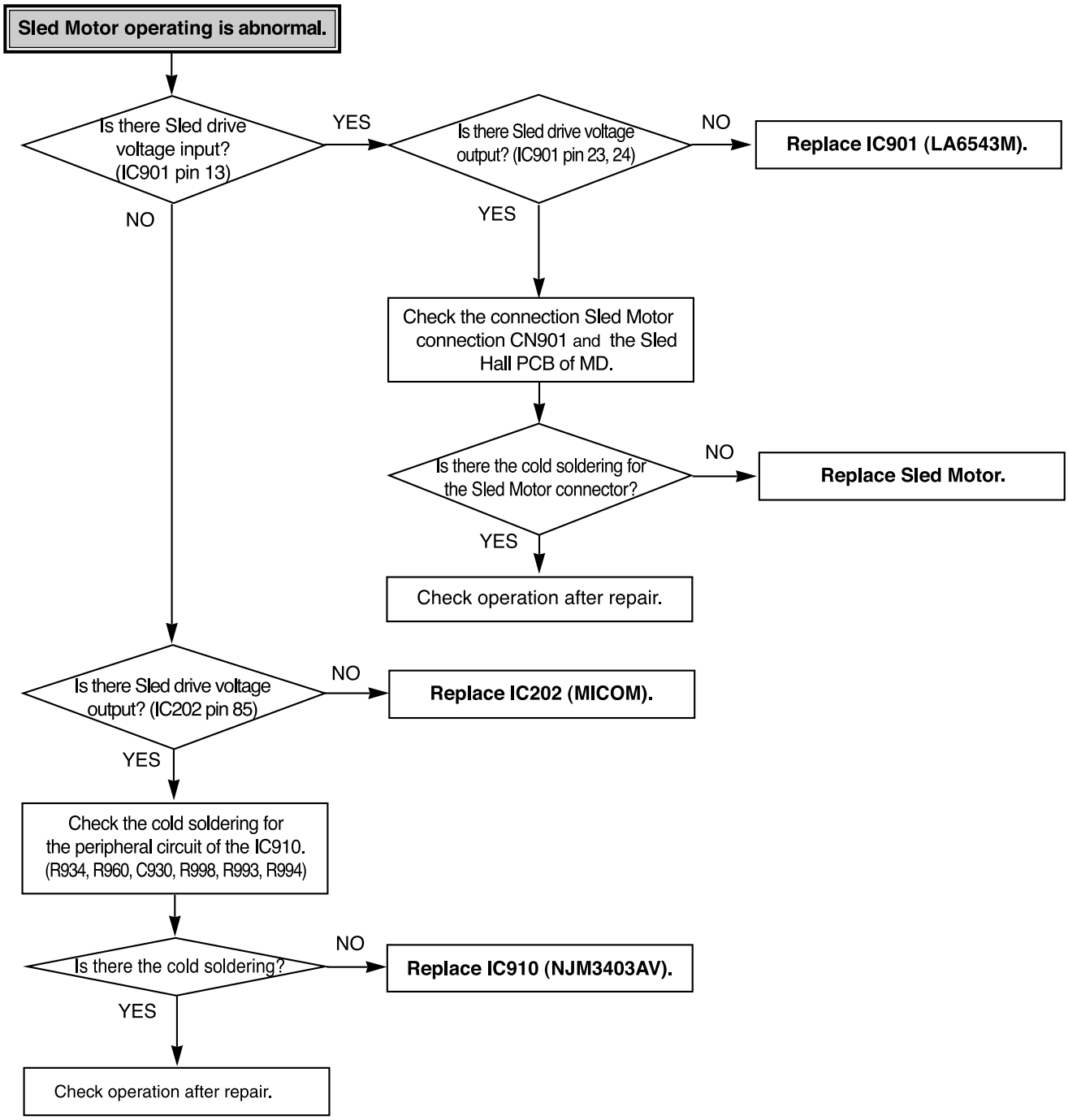

TOC is abnormal
N
Is SVC-1 blinking?
Y
Go to "SVC Check"
N
Is Disc rotating too fast
Y
Go to "Spindle control is abnormal" 3
N
Does Disc rotate slowly or stop?
Y
Go to "Spindle control is abnormal" 4
Is Lock signal "H"
IC 501 pin 119
Y
Go to "Spindle control is abnormal" 4
N
Check disc


SVC-1 Check
Are +5VA, +5VD, powering
N
Check cable (PN 105)
Y
Is Signal Input to the pin 108,
105, 740, of IC301?
N
Check cable (PN 606)
Y
Check the pin 12, 14, 16
of the IC202


Dubbing is abnormal
Is Rec Stand by made correctly?
N
Check the pin 7, 6 of IC301
Y
Is Auto stop during reconding
Y
Check the signal 40 ~ 70 of IC301
N
Audio Song is out ?
N
Check RFDC and Go to Laser is abnormal
Y
Check disc or CDP Bond's Playability


Recording is abnormal
Is Rec standby made correctly?
N
Check Input mode
Y
Is Sound monitor out?
N
Check IC304
Y
Is the monitor sound good?
N
Check IC308
Y
Is play back correctly?
N
Check RF DC and Goto Laser is abnormal
Y
Check IC306 and the pin 28, 30, 32 of IC501


Tray operating is abnormal.
(Tray open/close doesn't work)
Is there Tray drive voltage input? (IC901 pin 7)
YES
Is there Tray drive voltage output? (IC901 pin 31, 32)
NO
Is IC901 pin 6 "H" ? (TRAY_MUTE)
NO
YES
NO
YES
Check Tray Connector, Motor Line, Mechanism. If it's OK, Replace Motor.
Check TRAY_MUTE and related circuit. Then, repair it.
Replace IC901 (LA6543).
Is the communication normal between IC503 pin 15, 16, 17 and IC202 pin 24, 19, 18?
NO
Check the pattern, then repair it.
YES
When IC503 pin 5 is open, Is there Tray drive signal output?
YES
Check TRAY_CTL pattern. (IC503 pin5, IC901 pin 7)
NO
Replace IC503 (M62352).


Sled Motor operating is abnormal.
Is there Sled drive voltage input? (IC901 pin 13)
YES
Is there Sled drive voltage output? (IC901 pin 23, 24)
NO
Replace IC901 (LA6543M).
NO
YES
Check the connection Sled Motor connection CN901 and the Sled Hall PCB of MD.
Is there the cold soldering for the Sled Motor connector?
NO
Replace Sled Motor.
YES
Check operation after repair.
Is there Sled drive voltage output? (IC202 pin 85)
NO
Replace IC202 (MICOM).
YES
Check the cold soldering for the peripheral circuit of the IC910. (R934, R960, C930, R998, R993, R994)
Is there the cold soldering?
NO
Replace IC910 (NJM3403AV).
YES
Check operation after repair.

Focus Actuator operating is abnormal.

Is there Focus Search drive voltage output? (IC901 pin 9)

NO

Is there Focus Search drive voltage output? (IC501 pin 1, 13)

NO

Check the peripheral circuit and communication of IC501 and MICOM. If it's normal, **replace IC501 (CXD3011R-1)**

YES

YES

Check the peripheral circuit of IC913. If it's normal, **replace IC913 (NJM3414AM)**

Is there Focus Search drive voltage output? (IC901 pin 28, 29)

YES

Check the connection of Actuator Connector and the short of FFC. If it's OK, replace Pick-up.

NO

Is IC901 pin 15 " H"?

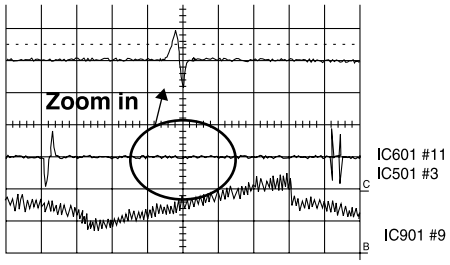
NO

Replace IC901 (LA6543M)

YES

Check the area between MICOM and IC901 pin 15. If it's OK, **Replace IC202 (MICOM)**

Go to <Picture 3>



Spindle Motor operating is abnormal.

Does P/U move outside one more time in the beginning?
- YES → **Go to "RFDC OUTPUT is abnormal"**
- NO →

Is there spindle drive voltage output? (IC551 pin 4)
- YES → Is there Spindle drive voltage output? (IC551 pin 2, 27, 28)
  - YES → Check the connection of Spindle connector and the open of FFC. If it's OK, replace spindle motor.
  - NO → Is IC551 pin 11 "H"?
    - YES → Replace Spindle Drive IC **IC551 (LB11995)**
    - NO → If IC204 (74VHC374) is normal, replace IC202 (MICOM)
- NO →

IS there Spindle drive voltage output? (IC556 pin 7)
- NO → Is there MPWM signal ouput? (IC209 RL5E808 pin 8)
  - YES → **Check the peripheral circuit of IC556 (NJM2100M). If it's OK, replace IC556**
  - NO → **Check the operation and the cold soldering for the IC209. (RL5E808)**
- YES →

Is IC555 pin 5 (DMCON) "H"?
- NO → **Check the operation and the cold soldering for the IC209. (RL5E808)**
- YES →

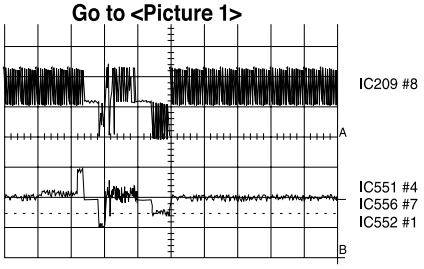
Is there Spindle drive voltage output? (IC552 pin 1)
- NO → **Replace IC555 (TC4W53FU)**
- YES → (A)

Check the cold soldering for the area of IC552 (NJM3403AV), IC503 (BU4053) (Check the short of Register and capacitor)

Is there the cold soldering?
- NO → **Replace IC552 (NJM3403AV).**
- YES →

Check operation after repairing the cold soldering.

Go to <Picture 1>



RFDC OUTPUT is abnormal.

Is RFDC output normal? (IC501 pin 141)

YES → Is FOK "H"? (IC501 pin 105)

NO → Check the cold soldering for the IC501 pin 141, 105. If it's OK, **replace IC501 (CXD3011R-1)**

YES → Go to "FOCUS Servo is unstable"

NO → Is RRF output normal? (IC601 pin 63)

NO → D

YES → Does IC604 operate normally?

NO → **Replace IC604 (EL2245)**

YES → Is MPXO (RRF) output normal? (IC601 pin 64)

NO → Check the cold soldering for the IC601 pin 63, 64. If it's OK, **replace IC601 (AK8563)**

YES → Is MPXO (RRF) input normal? (IC202 pin 81)

NO → Check the cold soldering for the IC202 pin 81, R203, C272.

YES → Check the cold soldering for the R203, C272 around IC202 pin 81. If it's OK, **replace IC202 (MICOM).**

D → Is A, B, C, D output signal of Pick-up normal? (CN601 pin 9, 10, 15, 16)

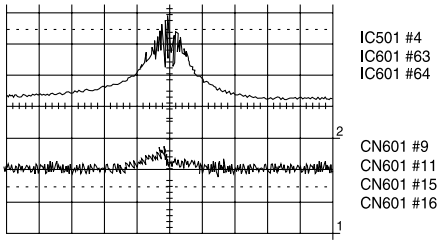
NO → Laser Power Output = 1.0 mW ?

NO → **Go to "Laser is abnormal"**

YES → Check the connection of Pick-up. Connector and the open of FFC. If it's OK, replace Pick-up.

YES → Check the cold soldering for the area between Pick-up connector and IC601. If it's OK, **replace IC601 (AK8563)**

Go to <Picture 2>



FOCUS Servo is unstable.

Is IC601 pin 11(FE) output normal in Focusing UP/DOWN?

NO → D

YES

Is IC501 pin 3 (FE) input normal in Focusing UP/DOWN?

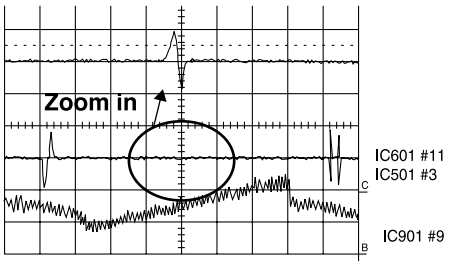
YES → Is there normal drive voltage output from IC501 pin 113 (FAO) in Focusing UP/DOWN?

YES → **Go to "Focus Actuator operating is abnormal"**

NO → **Check the peripheral circuit of IC603 (BU4053), IC601 (NJM3403).** If it's OK, Replace it.

NO → **Replace IC501 (CXD3011R-1)**

Go to <Picture 3>



Tracking Servo is unstable.

Is IC601 pin 10 (TE) output Normal in Focusing ON and Tracking OFF?

NO → D

YES

Is IC501 pin 143 (TE) input normal in Focusing ON and Tracking OFF?

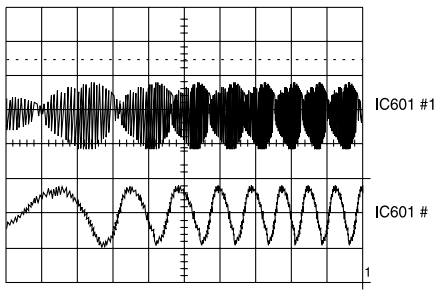
YES → Is there normal drive voltage output from IC501 pin 112 (TAO) in Tracking Servo ON?

YES → Check Drive IC (IC901) and P/U Referring to "Focus Actuator operating is abnormal".

NO → **Check the peripheral circuit of IC603 (BU4053), IC610 (NJM3403).** If it's OK, Replace it.

NO → **Replace IC501 (CXD3011R-1)**

Go to <Picture 8>



Spindle Control is abnormal 1.

Is there RFAC Signal input? (IC501 pin 13)

YES

NO

Is IC601 pin 29 output normal? (DECEFM)

YES → **Replace IC507 (TC7SH04F).**

NO

Check the output status of IC601 pin 29 when it open.

Normal?

NO → **Replace IC601 (AK8563).**

YES

Check the status of R and C peripheral circuit of IC605 (BU4066) and IC507.

Spindle Control is abnormal 2.

Is MDP signal output normal? (IC501 pin 117)

NO

Does Track Servo operate normally?

YES

Check the peripheral circuit of IC501. If it's OK, **replace IC501 (CXD3011R-1).**

NO → **Go to "Tracking Servo is unstable"**

YES

Is there spindle drive voltage output in IC556 pin 1?

NO

Check the peripheral circuit of IC556. If it's OK, **replace IC506 (NJM2100).**

YES

Is there spindle drive voltage ouput in IC552 pin 1?

YES → A

NO

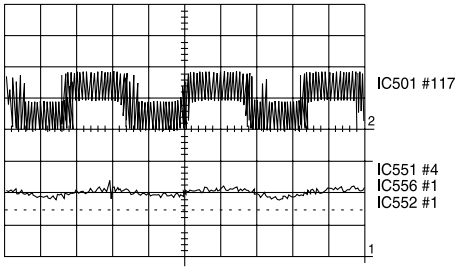
Is IC555 pin 5 "H"?

YES → Replace IC555 (TC4W53FU).

NO

Check Disc Recognition. If it's OK, Replace IC555 and IC209 after checking.

Go to <Picture 5>



Disc Recognition is abnormal.

Is IC205 pin 19 "H" ? (CDR/RW)

YES → Check the circuit related with CDR/RW signal.

Normal?

YES → B

NO → Repair related part.

NO

C

Do RECD1, RECD2 signals input to IC202 pin 48, 49 normally?

YES → **Replace IC202 (MICOM).**

NO

Does IC601 pin 26, 27 output normally?

YES → Check the cold soldering for the R661, R668, R644, R645.

NO

Is there normal input to IC601 pin 62?

NO → Check the cold soldering for the R675, C644 and IC601 pin 62.

YES

Replace IC601(AK8563).

B

Check IC601 pin 63 (RRF output)
Requirement:
First Recognition try : Over **1.5Vpp**
Second Recognition : Over **1.0 Vpp**

Satisfy?

YES → **Replace IC202 (MICOM).**

NO

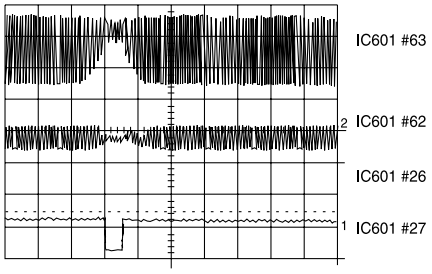
Is Laser Power output normal?
First Recognition try : **1.0 mW**
Second Recognition try : Over **1.2 mW**

NO → **Go to "Laser is abnormal"**

YES

Go to "RFDC OUTPUT is abnormal"

Go to <Picture 4>



Spindle Control is abnormal 3

Is IC555 pin 5 “L”? (DMCON)

YES

NO

C

Spindle Control is abnormal 4

Is Spindle drive voltage output (IC556 pin 7)

YES

A

NO

Is Spindle drive voltage output normal? (IC209 pin 8 MPWM)

YES

Check the peripheral circuit of IC556. If it’s OK, **replace IC556 (NJM2100M).**

NO

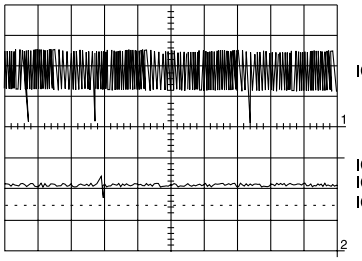
Is there normal input to IC209 pin 174 (WBLIN) ?

YES

Check the peripheral circuit of IC209. If it’s OK, **replace IC209 (RL5E808B).**

NO

Go to <Picture 6>



Is IC601 pin 22 (ATFG) output normal?

YES

Check PCB between IC209 and IC601.

NO

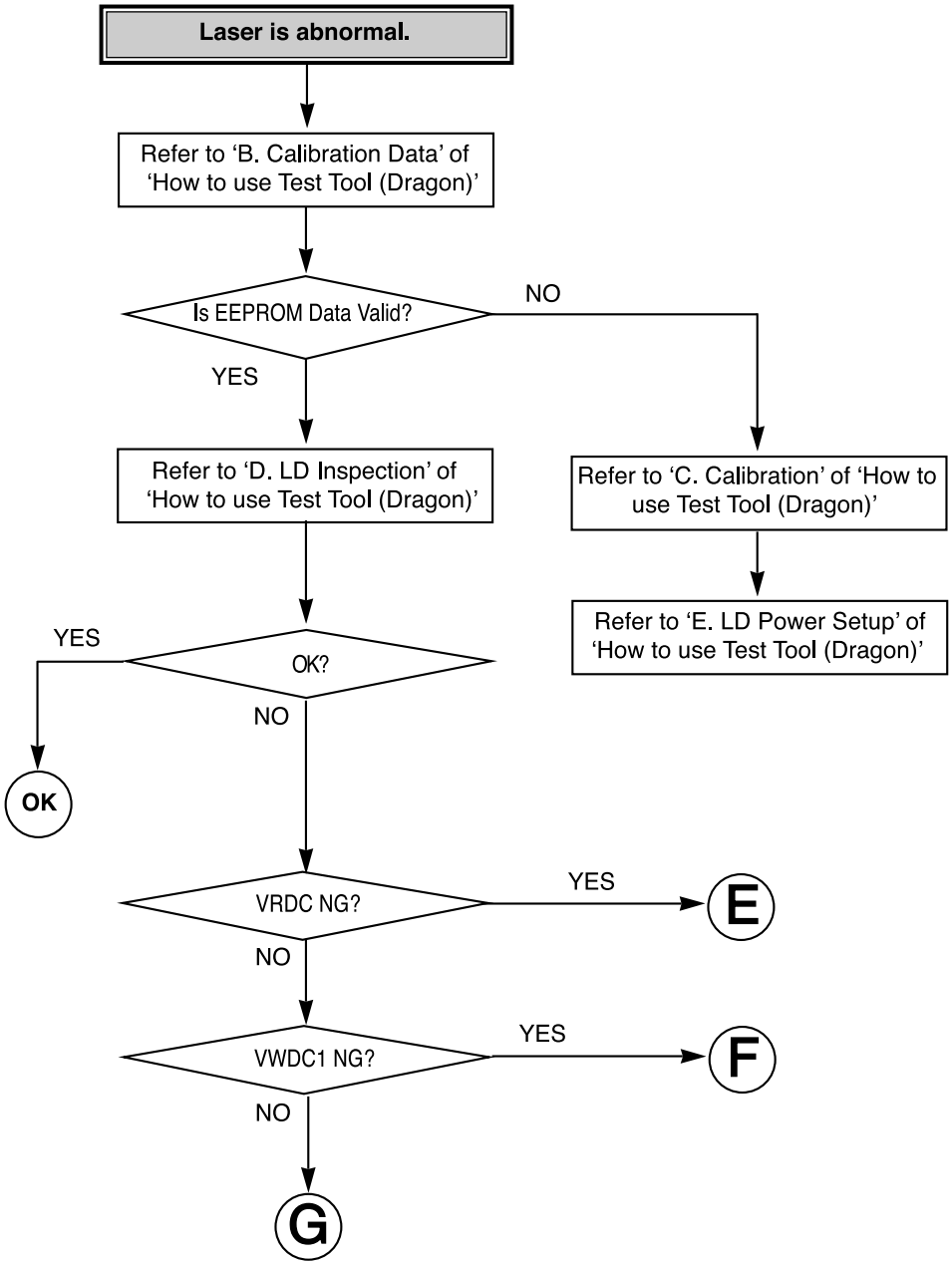
Is IC601 pin 46 (ATFM) output normal?

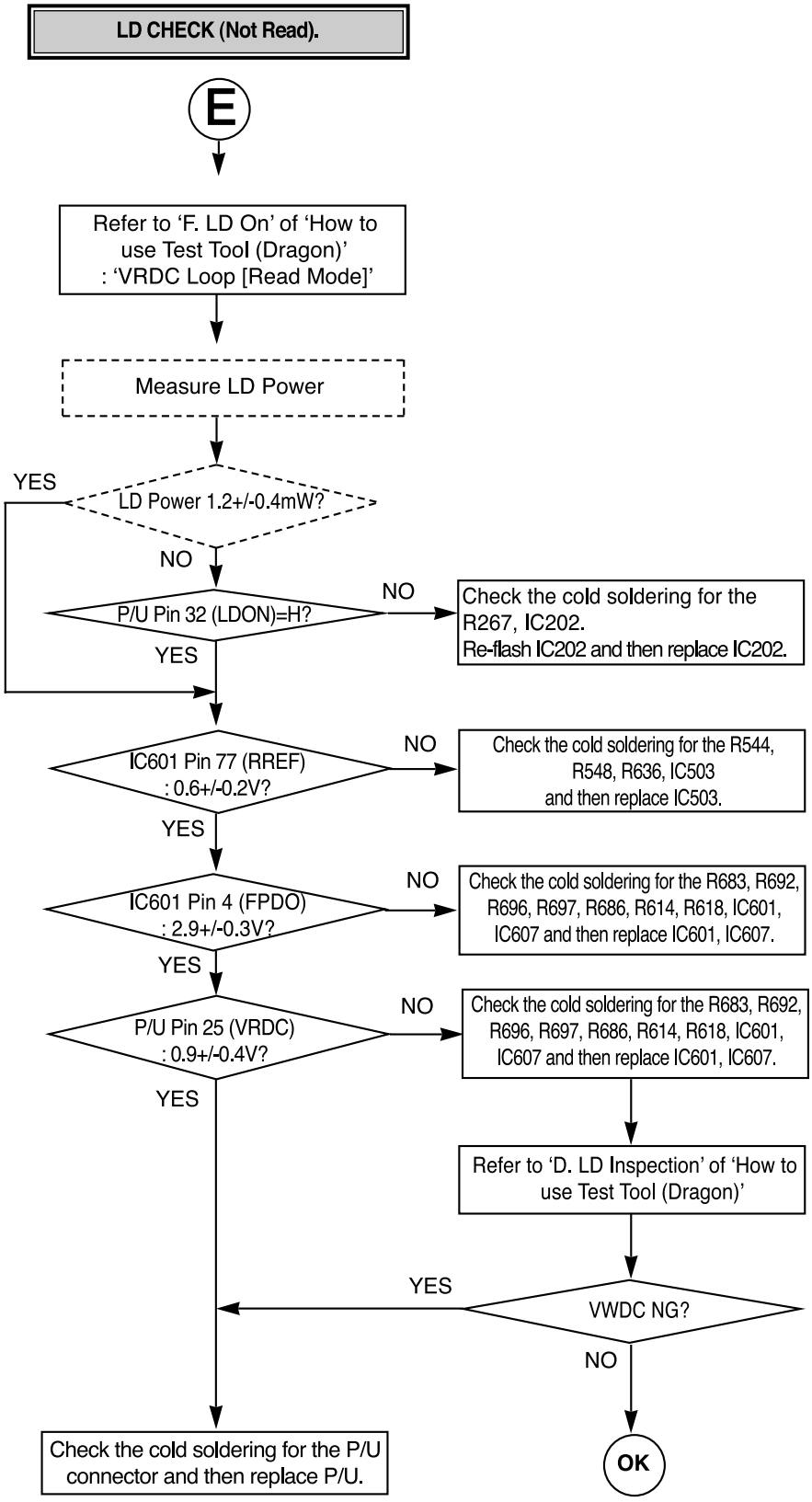
YES

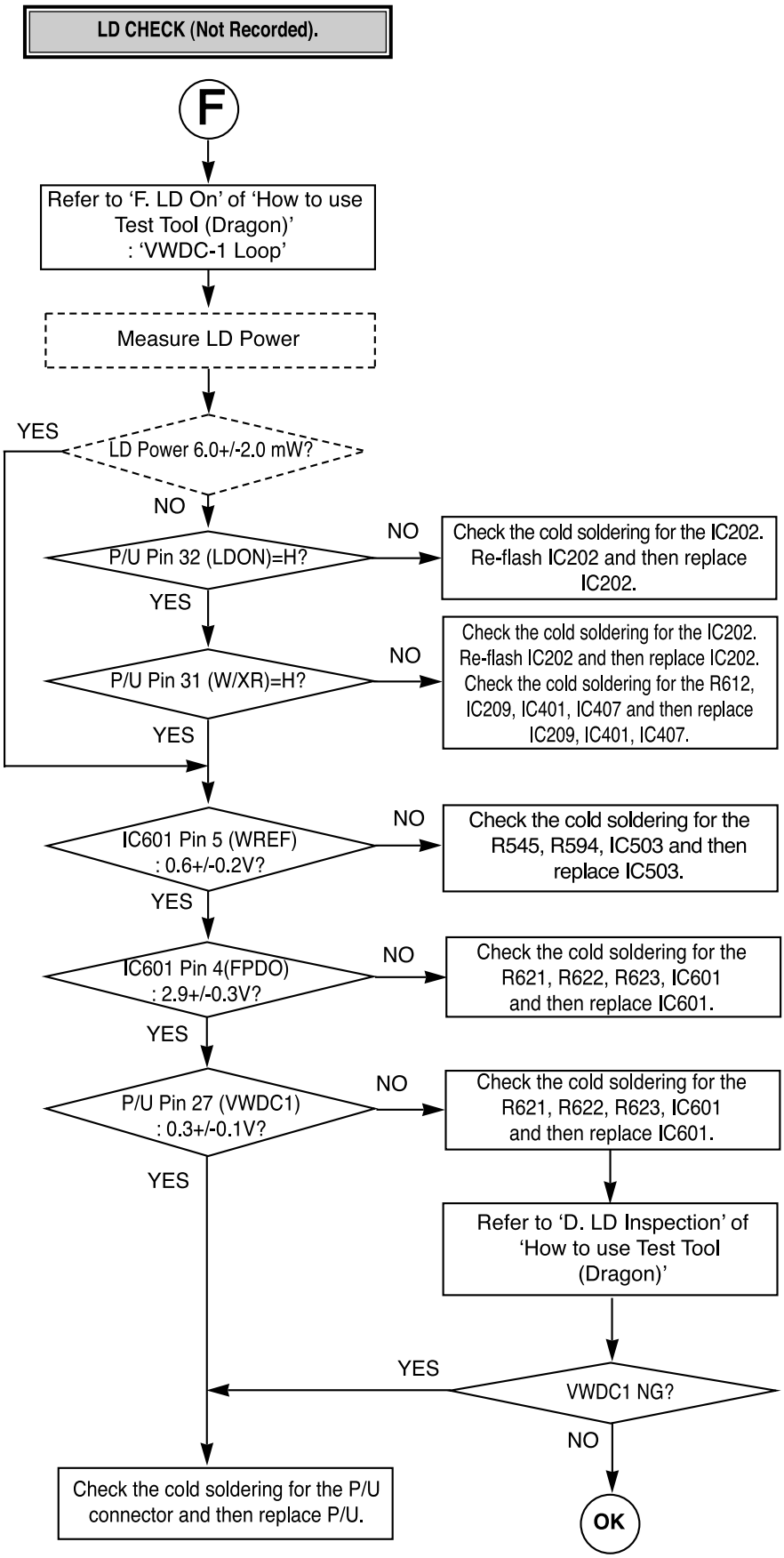
Replace IC601 (AK8563).

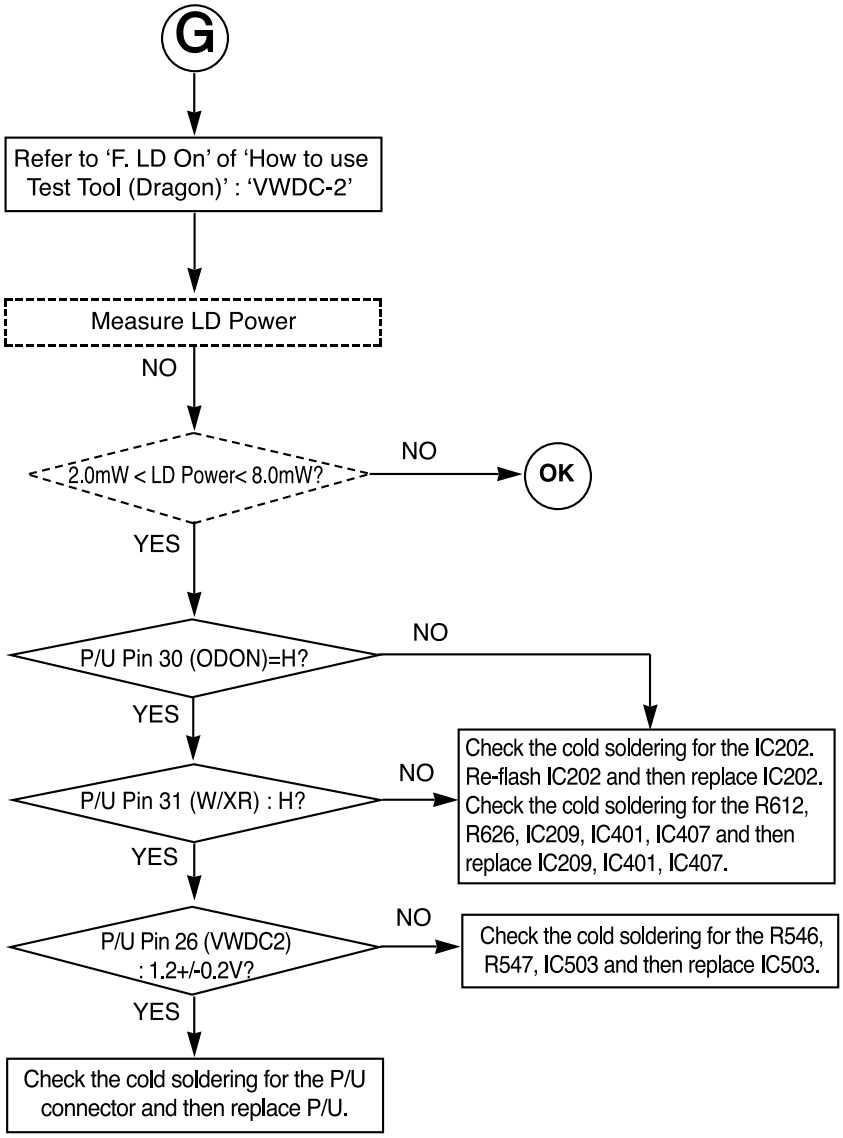
NO

D

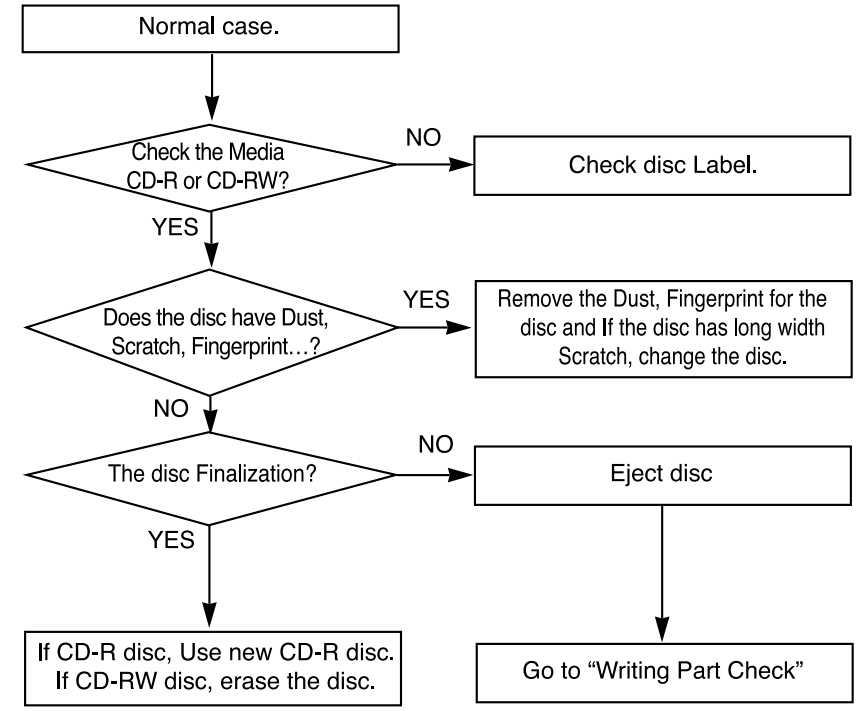

Laser is abnormal.
Refer to 'B. Calibration Data' of 'How to use Test Tool (Dragon)'
Is EEPROM Data Valid?
NO
YES
Refer to 'D. LD Inspection' of 'How to use Test Tool (Dragon)'
Refer to 'C. Calibration' of 'How to use Test Tool (Dragon)'
Refer to 'E. LD Power Setup' of 'How to use Test Tool (Dragon)'
YES
OK?
NO
OK
VRDC NG?
YES
E
NO
VWDC1 NG?
YES
F
NO
G


LD CHECK (Not Read).
E
Refer to 'F. LD On' of 'How to use Test Tool (Dragon)' : 'VRDC Loop [Read Mode]'
Measure LD Power
YES
LD Power 1.2+/-0.4mW?
NO
P/U Pin 32 (LDON)=H?
NO
Check the cold soldering for the R267, IC202. Re-flash IC202 and then replace IC202.
YES
IC601 Pin 77 (RREF) : 0.6+/-0.2V?
NO
Check the cold soldering for the R544, R548, R636, IC503 and then replace IC503.
YES
IC601 Pin 4 (FPDO) : 2.9+/-0.3V?
NO
Check the cold soldering for the R683, R692, R696, R697, R686, R614, R618, IC601, IC607 and then replace IC601, IC607.
YES
P/U Pin 25 (VRDC) : 0.9+/-0.4V?
NO
Check the cold soldering for the R683, R692, R696, R697, R686, R614, R618, IC601, IC607 and then replace IC601, IC607.
YES
Refer to 'D. LD Inspection' of 'How to use Test Tool (Dragon)'
YES
VWDC NG?
NO
Check the cold soldering for the P/U connector and then replace P/U.
OK


LD CHECK (Not Recorded).
F
Refer to 'F. LD On' of 'How to use Test Tool (Dragon)' : 'VWDC-1 Loop'
Measure LD Power
YES
LD Power 6.0+/-2.0 mW?
NO
NO
P/U Pin 32 (LDON)=H?
Check the cold soldering for the IC202. Re-flash IC202 and then replace IC202.
YES
NO
P/U Pin 31 (W/XR)=H?
Check the cold soldering for the IC202. Re-flash IC202 and then replace IC202. Check the cold soldering for the R612, IC209, IC401, IC407 and then replace IC209, IC401, IC407.
YES
NO
IC601 Pin 5 (WREF) : 0.6+/-0.2V?
Check the cold soldering for the R545, R594, IC503 and then replace IC503.
YES
NO
IC601 Pin 4(FPDO) : 2.9+/-0.3V?
Check the cold soldering for the R621, R622, R623, IC601 and then replace IC601.
YES
NO
P/U Pin 27 (VWDC1) : 0.3+/-0.1V?
Check the cold soldering for the R621, R622, R623, IC601 and then replace IC601.
YES
Refer to 'D. LD Inspection' of 'How to use Test Tool (Dragon)'
YES
VWDC1 NG?
NO
Check the cold soldering for the P/U connector and then replace P/U.
OK


G
Refer to 'F. LD On' of 'How to use Test Tool (Dragon)' : 'VWDC-2'
Measure LD Power
NO
2.0mW < LD Power< 8.0mW?
NO
OK
YES
P/U Pin 30 (ODON)=H?
NO
YES
P/U Pin 31 (W/XR) : H?
NO
Check the cold soldering for the IC202. Re-flash IC202 and then replace IC202. Check the cold soldering for the R612, R626, IC209, IC401, IC407 and then replace IC209, IC401, IC407.
YES
P/U Pin 26 (VWDC2) : 1.2+/-0.2V?
NO
Check the cold soldering for the R546, R547, IC503 and then replace IC503.
YES
Check the cold soldering for the P/U connector and then replace P/U.

In case of writing fail.



Writing Part Check.

Go to “Laser is abnormal”

Load tray with CD-R or RW Disc.

Run the Writing Tool (Easy CD Creator).

Run the Writing with Tool (Easy CD Creator).

Does the Display Toggle (on/off) when Writing start (OPC operation)?

NO

Does the IC204 (74VHC374) pin 15 Toggle (on/off) during Writing?

NO

YES

YES

Check the cold soldering for IC204 (74VHC374) pin 15, R337, Q302, R334, LED2.

Check the cold soldering for IC204 (74VHC374) and then replace IC204. Check communication line between IC204 and IC202 (MICOM).

Does finished the writing without Error?

NO

YES

Is the written file read normally?

NO

Eject Tray.

YES

Go to “ALPC Logic Circuit Check”.

YES

Is the re-written file read normally?

NO

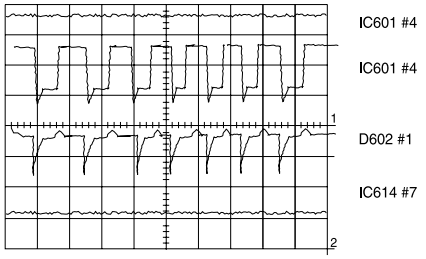
Check the cold soldering for IC614, R274, IC209 pin 164 and then replace IC614, IC209.

NO

Is the IC614 pin 7 (ROPC2) ‘pulse’ when CD-R writing?

YES

Go to <Picture 9>



Go to “BETA Measurement Circuit Check”

OK

ALPC Logic Circuit Check.

Refer to 'F. LD On' of 'How to use Test Tool (Dragon)' : 'CD-R Recording Mode'

Is the IC205 pin 19 (CDR/RW) 'H'?
- NO → Check the cold soldering for IC205 pin 19. Check communication line between IC205 and IC202 (MICOM).
- YES ↓

Is the IC205 pin 16 (WR/RE) 'H'?
- NO → Check the cold soldering for IC205 pin 16. Check communication line between IC205 and IC202 (MICOM).
- YES ↓

Is the IC209 (RL5E808B) pin 166 (WGATE) 'H'?
- NO → Check the cold soldering for IC407, IC209 pin 166. Check communication line between IC202 and IC209 (RL5E808B).
- YES ↓

Is the IC601 pin 43 (WLDON) 'H'?
- NO → Check the cold soldering for IC401, IC407, R401, R417.
- YES ↓

Is the IC404 pin 3 (CDR_WR) 'H'?
- NO → Check the cold soldering for IC403, IC404, IC406.
- YES ↓

Is the IC404 pin 8 (WREN) & pin 11 (RFGUP)'L'?
- NO → Check the cold soldering for R416, IC404, IC405.
- YES ↓

Is the IC209 pin 152 (EFM1), 153 (EFM2), 162 (RESAMP), 163 (ROPC1), 164 (ROPC2) 'pulse'?
- NO → Check the cold soldering for IC209 pin 152, 153, 162, 163, 164. Check the cold soldering for IC402, IC407.
- YES ↓

Is the IC601 pin 39 (WFPDSH),38 (RFPDSH), 37 (WBLSH), 36 (SPDSH), 35 (MPDSH) 'pulse'?
- NO → Check the cold soldering for IC601 pin 39, 38, 37, 36, 35. Check the cold soldering for R684, R651, R649, R497, R496, IC403, IC401.
- YES ↓

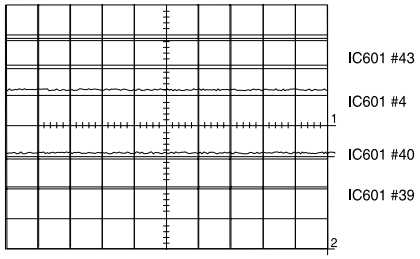
Is the CN601 pin 30 (ODON), 31 (W/XR) 'pulse'?
- NO → Check the cold soldering for R626, R612, R655, R657, C401, IC407, CN601 pin 30, 31.
- YES ↓

Dragon : Do LD 'Off'
- YES ↓

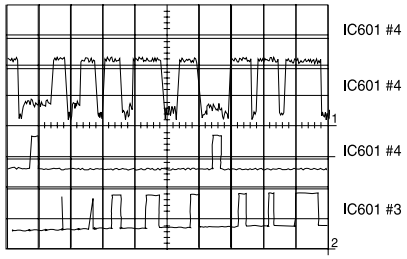
(K)

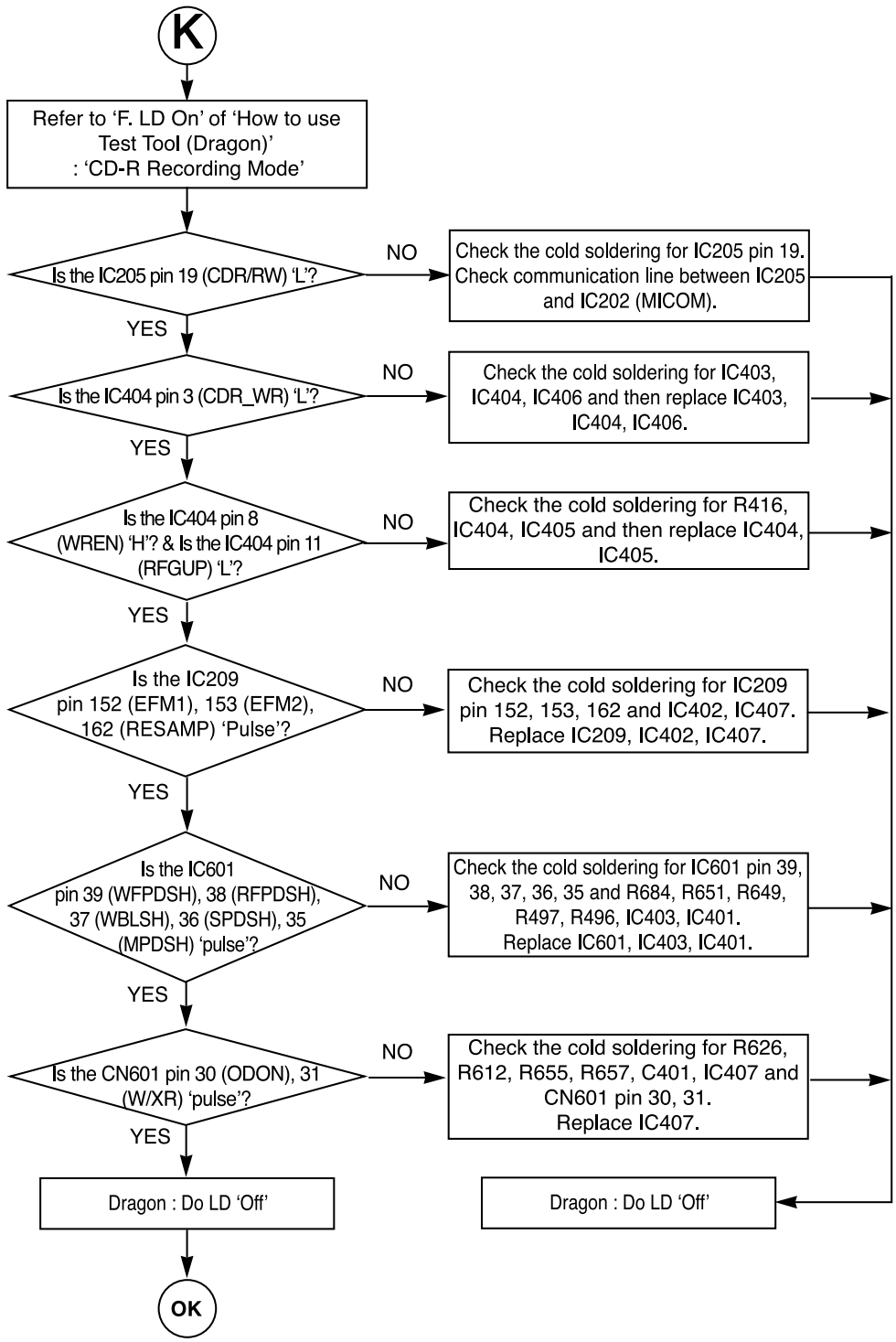
Dragon : Do LD 'Off'

Go to <Picture 10>

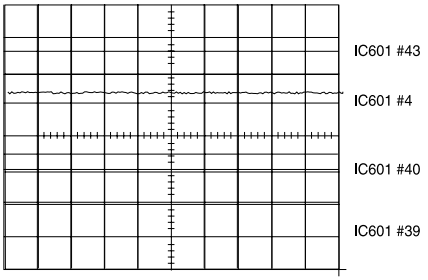


Go to <Picture 11>

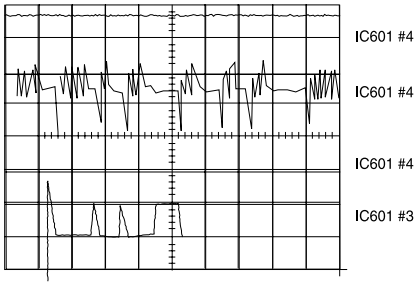


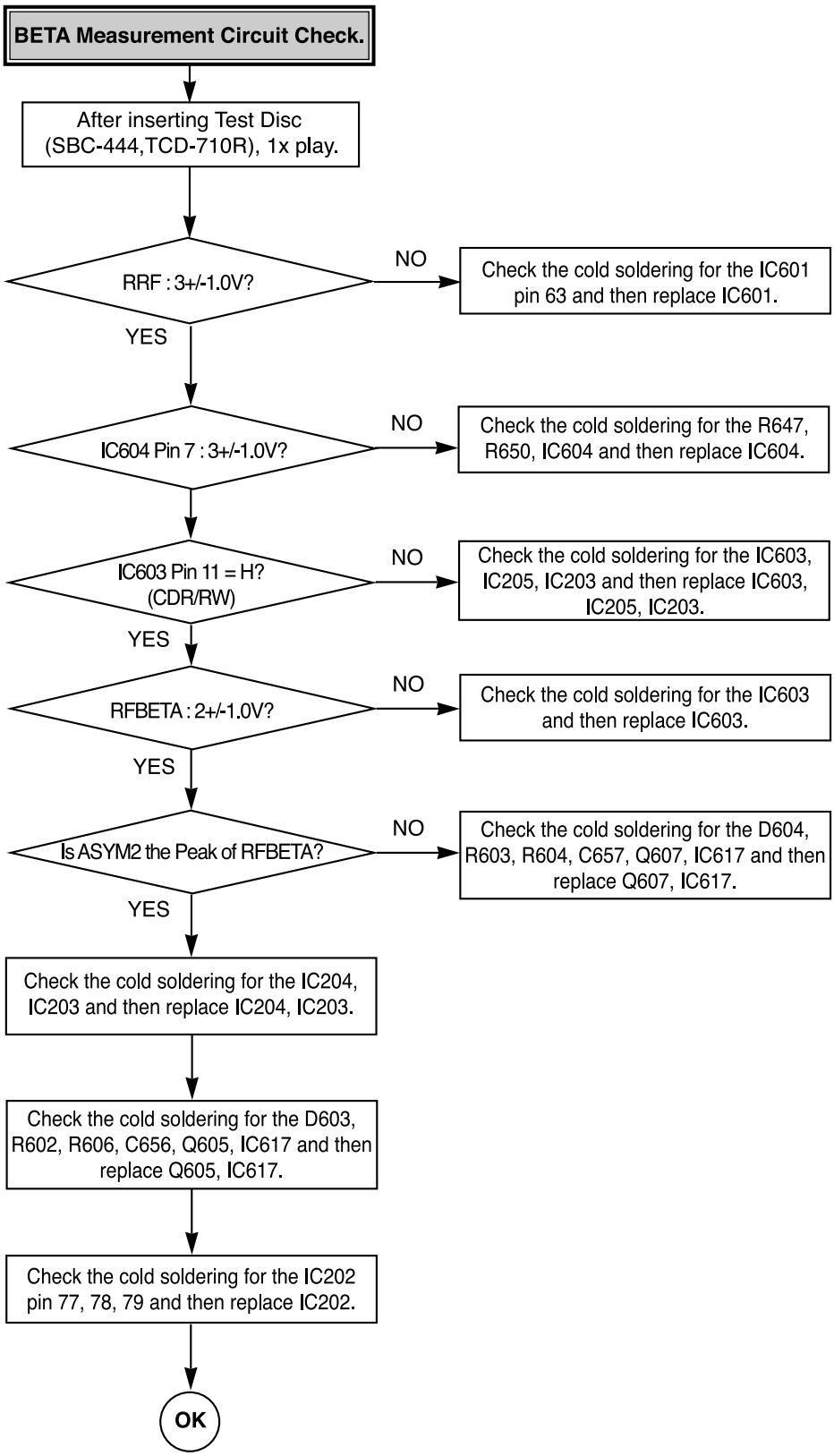

K
Refer to 'F. LD On' of 'How to use Test Tool (Dragon)' : 'CD-R Recording Mode'
Is the IC205 pin 19 (CDR/RW) 'L'?
NO
Check the cold soldering for IC205 pin 19. Check communication line between IC205 and IC202 (MICOM).
YES
Is the IC404 pin 3 (CDR_WR) 'L'?
NO
Check the cold soldering for IC403, IC404, IC406 and then replace IC403, IC404, IC406.
YES
Is the IC404 pin 8 (WREN) 'H'? & Is the IC404 pin 11 (RFGUP) 'L'?
NO
Check the cold soldering for R416, IC404, IC405 and then replace IC404, IC405.
YES
Is the IC209 pin 152 (EFM1), 153 (EFM2), 162 (RESAMP) 'Pulse'?
NO
Check the cold soldering for IC209 pin 152, 153, 162 and IC402, IC407. Replace IC209, IC402, IC407.
YES
Is the IC601 pin 39 (WFPDSH), 38 (RFPDSH), 37 (WBLSH), 36 (SPDSH), 35 (MPDSH) 'pulse'?
NO
Check the cold soldering for IC601 pin 39, 38, 37, 36, 35 and R684, R651, R649, R497, R496, IC403, IC401. Replace IC601, IC403, IC401.
YES
Is the CN601 pin 30 (ODON), 31 (W/XR) 'pulse'?
NO
Check the cold soldering for R626, R612, R655, R657, C401, IC407 and CN601 pin 30, 31. Replace IC407.
YES
Dragon : Do LD 'Off'
Dragon : Do LD 'Off'
OK

Go to <Picture 12>



Go to <Picture 13>

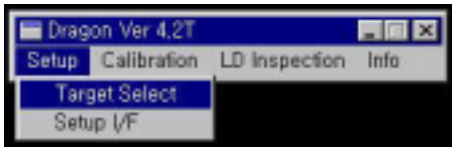



BETA Measurement Circuit Check.
After inserting Test Disc (SBC-444,TCD-710R), 1x play.
RRF : 3+/-1.0V?
NO
Check the cold soldering for the IC601 pin 63 and then replace IC601.
YES
IC604 Pin 7 : 3+/-1.0V?
NO
Check the cold soldering for the R647, R650, IC604 and then replace IC604.
IC603 Pin 11 = H? (CDR/RW)
NO
Check the cold soldering for the IC603, IC205, IC203 and then replace IC603, IC205, IC203.
YES
RFBETA : 2+/-1.0V?
NO
Check the cold soldering for the IC603 and then replace IC603.
YES
Is ASYM2 the Peak of RFBETA?
NO
Check the cold soldering for the D604, R603, R604, C657, Q607, IC617 and then replace Q607, IC617.
YES
Check the cold soldering for the IC204, IC203 and then replace IC204, IC203.
Check the cold soldering for the D603, R602, R606, C656, Q605, IC617 and then replace Q605, IC617.
Check the cold soldering for the IC202 pin 77, 78, 79 and then replace IC202.
OK

• How to use Test Tool (Dragon)

A. Start

1. Connect I/F Board to PC cannot 1 Port
2. Execute Dragon.exe on Windows (Dragon.exe & dragon.cfg Should be on same Directory)
3. Select “Setup” – “Setup I/F” on menu.
4. Select “COM 1 Port” on ‘Select I/F Methed’ –> Click “OK”
   (Don’t select “Select Transfer Rate”)



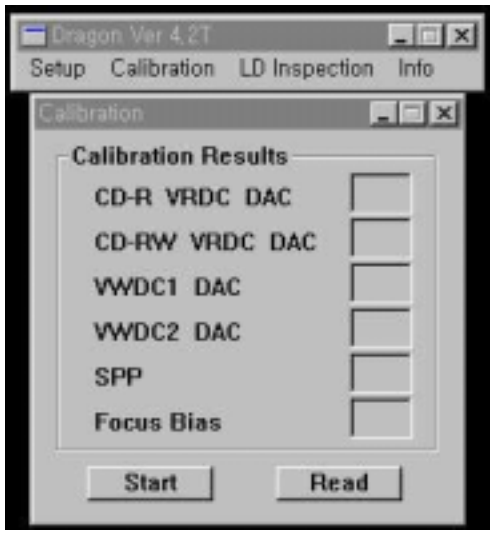
[I/F Setting window]

B. Check Calibration Data

1. Select “Calibration” - “Calibration” on menu.
2. Click “Read” on ‘Calibration’ window
   –> Results (hex data) will come out.
3. Check Data

CD-R VRDC DAC	: 32~5F
CD-RW VRDC DAC	: 28~55
VWDC1 DAC	: 40~A0
VWDC2 DAC	: 78~C8
SPP	: 90~B8
Focus Bias	: Not use

4. Close ‘Calibration’ window.



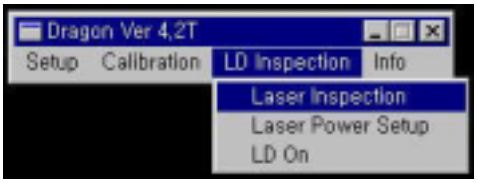
[Calibration window]

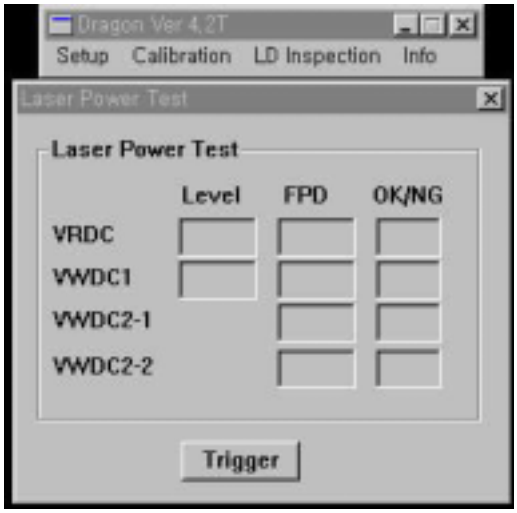
C. Calibration

1. Select “Calibration” - “Calibration” on menu.
2. Inserting Test Disc (SBC-444,TCD-710R) on Tray –> Load Disc.
3. Click “Start” on ‘Calibration’ window
4. Tray will be ejected after Calibration
   –> ‘Calibration Data (hex)’ will come out.
5. Check Data.
6. Close ‘Calibration’ window.

D. LD Test (Check VRDC/VWDC/FPD Level value)

1. Take out disc on Tray.
2. Select “LD Inspection” - “Laser Inspection” on menu.
3. Click “Trigger” on ‘Laser Power Test’ window –> Results will come out after testing.
   (Test Result will be displayed with ‘OK or NG’ on each item.)
4. Close ‘Laser Power Test’ window.

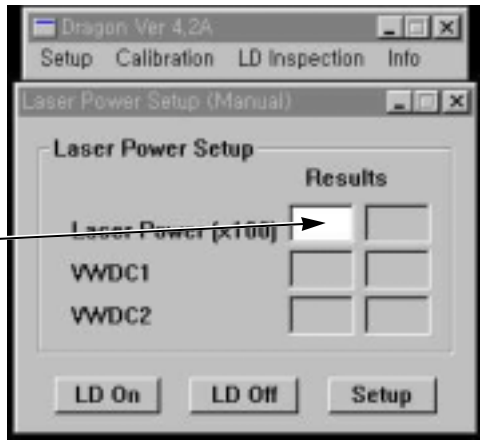




[LD Power Test window]

E.LD Power Setup (VWDC1/VWDC2 re-setup)

1. Take out disc on Tray.
2. Select “LD Inspection” - ”Laser Power Setup” on menu.
3. LD Power meter Setup
   (Frequency : 780nm, Measure Range : 0.01mW unit).
4. Click “LD On” on ‘LD Power Setup’ window.
   –> Pick-up will move outside.
   –> Laser will be emitted from LD.
5. Measure LD Power with LD Power meter.
   –> Type the result on blank.
   (Type without ‘.’ Down to two places of decimals.
   (ex) 11.34mW ==> 1134)
6. Click “Setup”. –> Result will be displayed with ‘OK or NG’.
7. Close ‘LD Power Setup’ window.



[LD Power Test window]

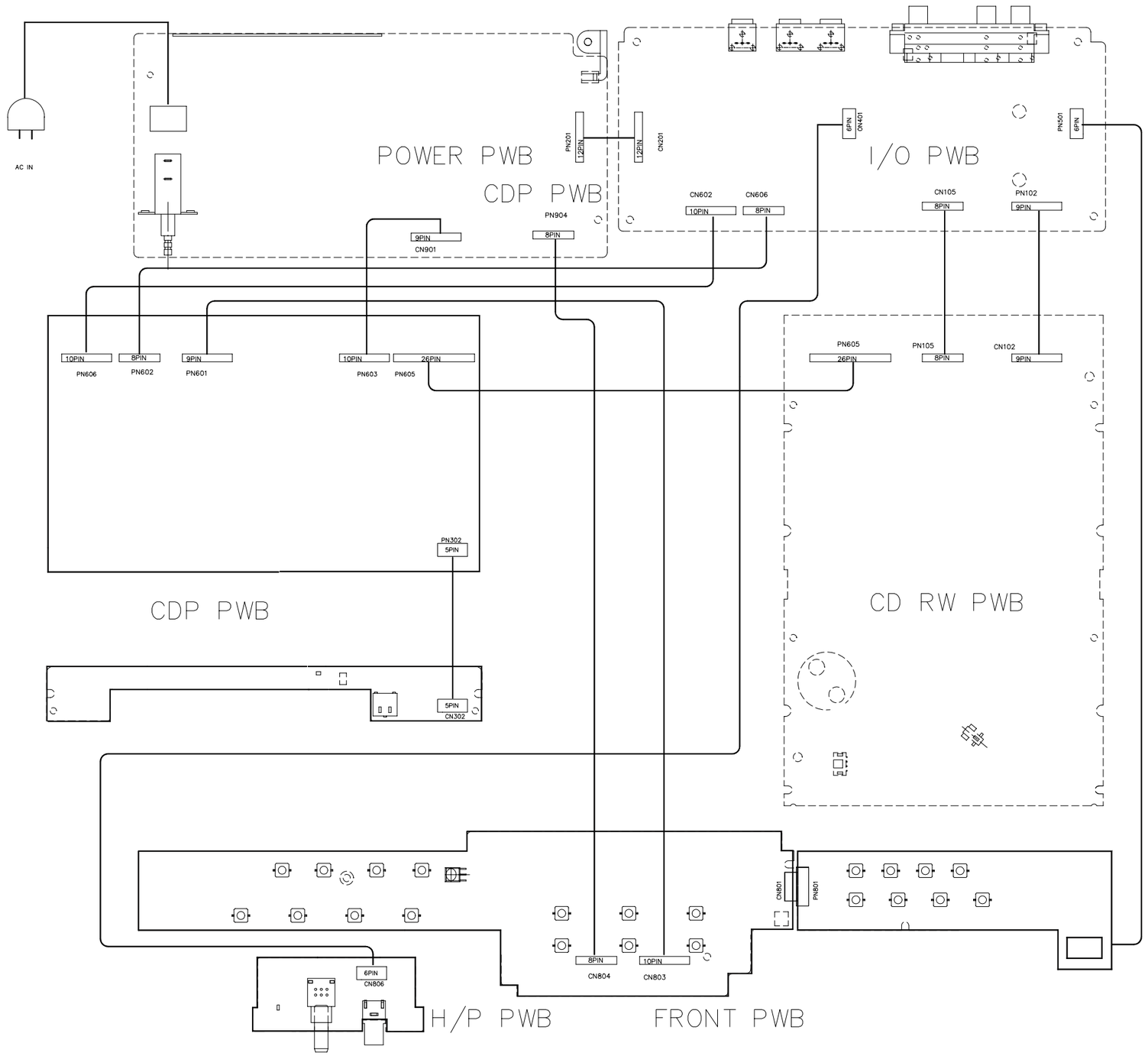
F. LD On

1. Take out disc on Tray.
2. Select “LD Inspection” - “LD ON” on menu.
3. Select “LD ON Mode” on ‘Laser On’ window. –> Click “On”.
   –> LD On
4. Execute Test (Measure LD Power).
5. Click “Off”. –> LD Off
6. Close ‘Laser On’ window.

* Speed setting is valid on “CD-R Recording Mode” & “CD-RW Recording Mode”.
“VRDC Loop”, “VWDC-1 Loop” and “VWDC-2” Mode output continuous Laser.
“CD-R Recording Mode” and “CD-RW Recording Mode” output Laser Pulse like real writing.

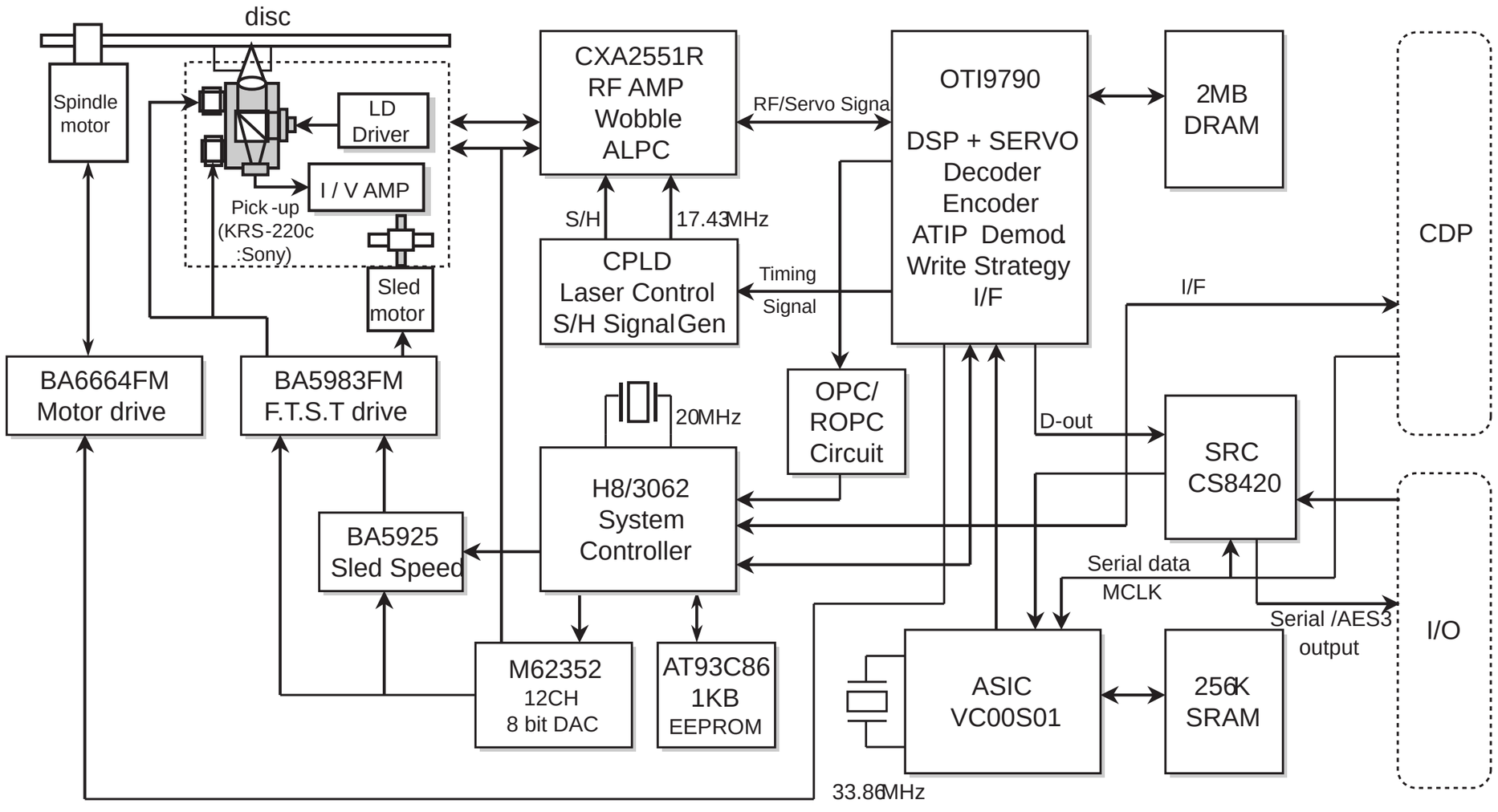
[LD On window]

WIRING DIAGRAM



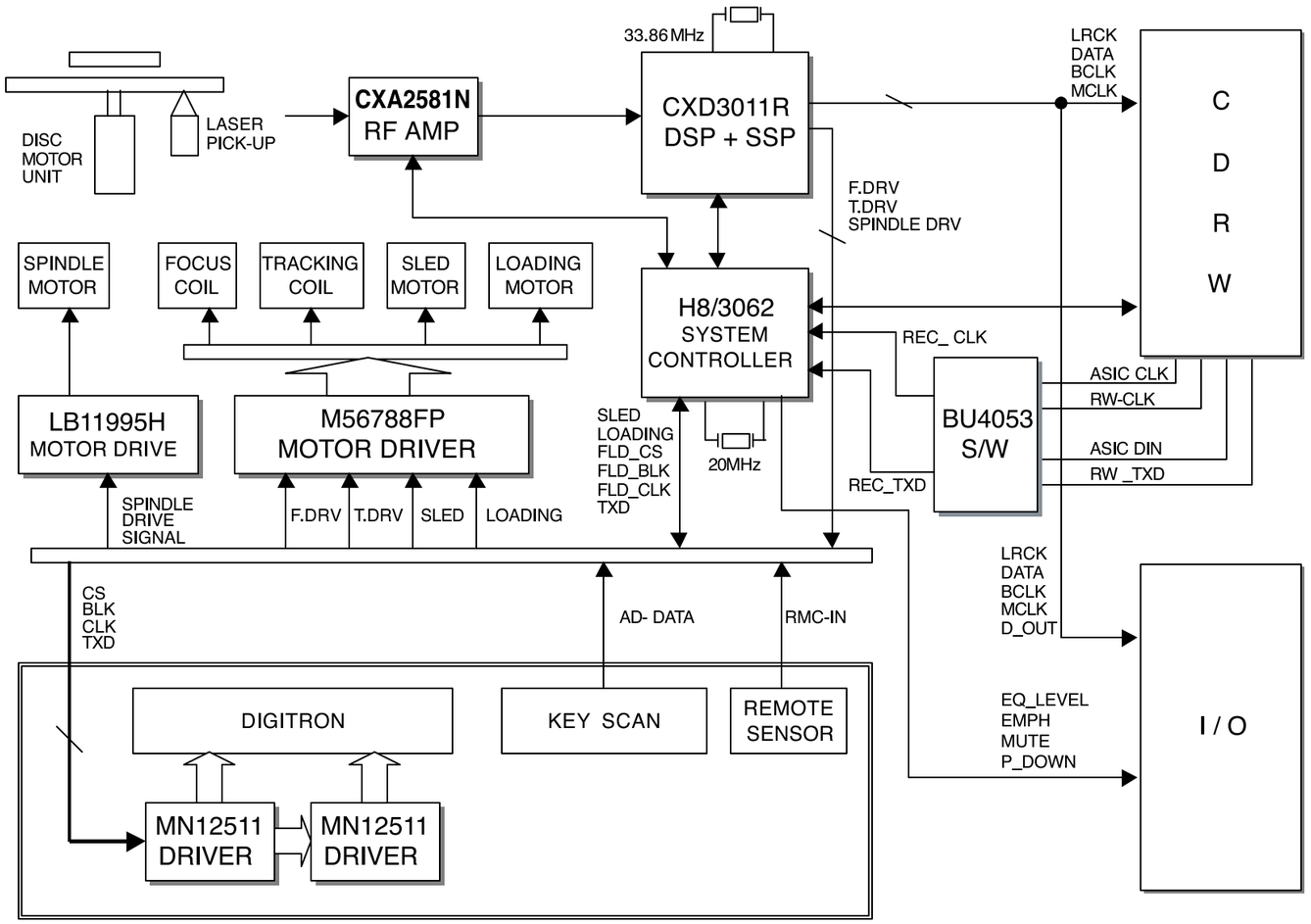
BLOCK DIAGRAM

• CD RECORD SECTION

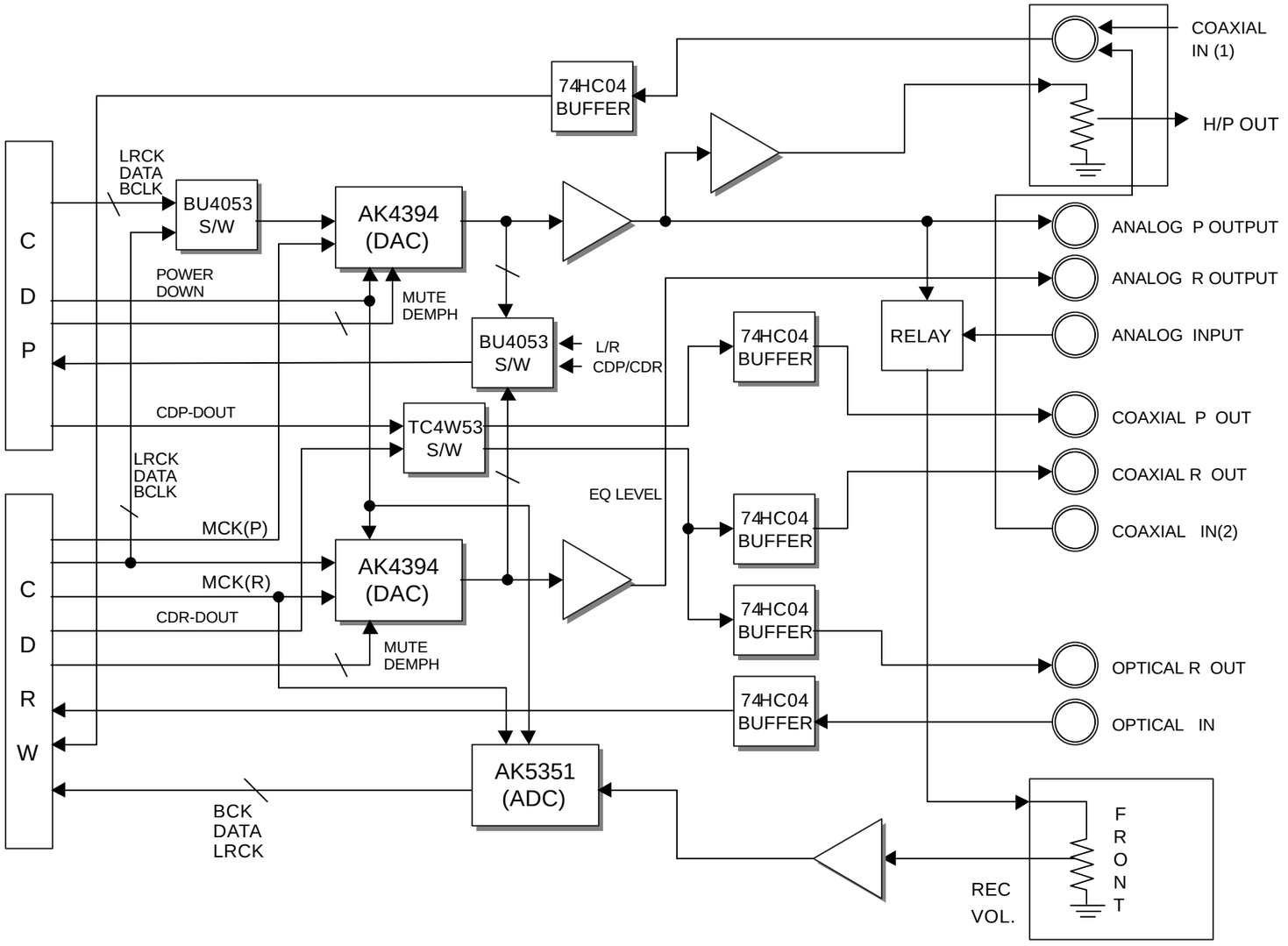


-

• CD PLAY SECTION

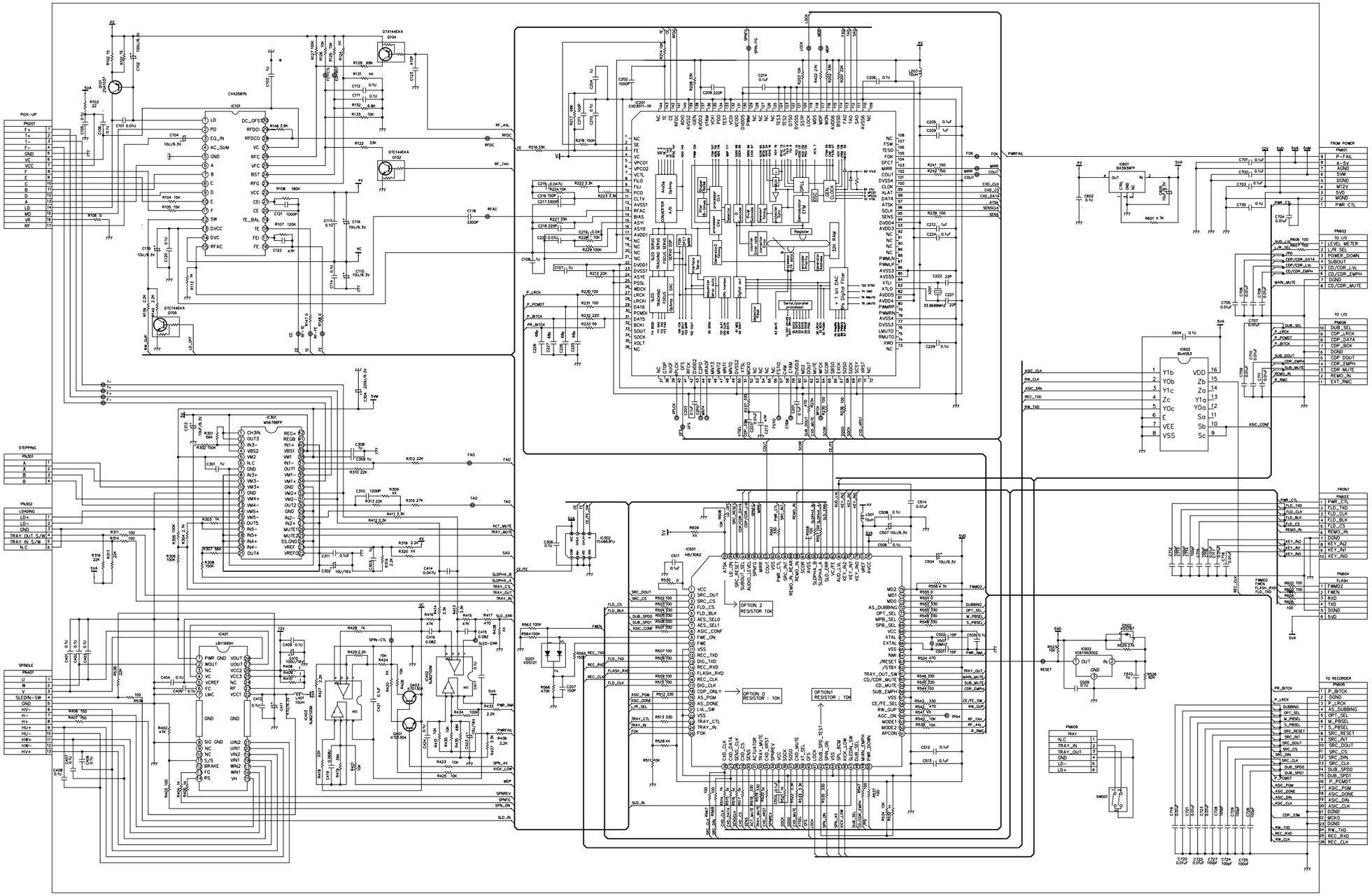


• IO SECTION


C
D
P
LRCK
DATA
BCLK
BU4053
S/W
POWER
DOWN
MUTE
DEMPH
AK4394
(DAC)
74HC04
BUFFER
COAXIAL
IN (1)
H/P OUT
ANALOG P OUTPUT
ANALOG R OUTPUT
ANALOG INPUT
BU4053
S/W
L/R
CDP/CDR
74HC04
BUFFER
RELAY
CDP-DOUT
TC4W53
S/W
LRCK
DATA
BCLK
EQ LEVEL
COAXIAL P OUT
COAXIAL R OUT
COAXIAL IN(2)
MCK(P)
C
D
R
W
MCK(R)
CDR-DOUT
AK4394
(DAC)
MUTE
DEMPH
74HC04
BUFFER
74HC04
BUFFER
OPTICAL R OUT
74HC04
BUFFER
OPTICAL IN
AK5351
(ADC)
BCK
DATA
LRCK
F
R
O
N
T
REC
VOL.

SCHEMATIC DIAGRAMS

• CD-PLAY SECTION



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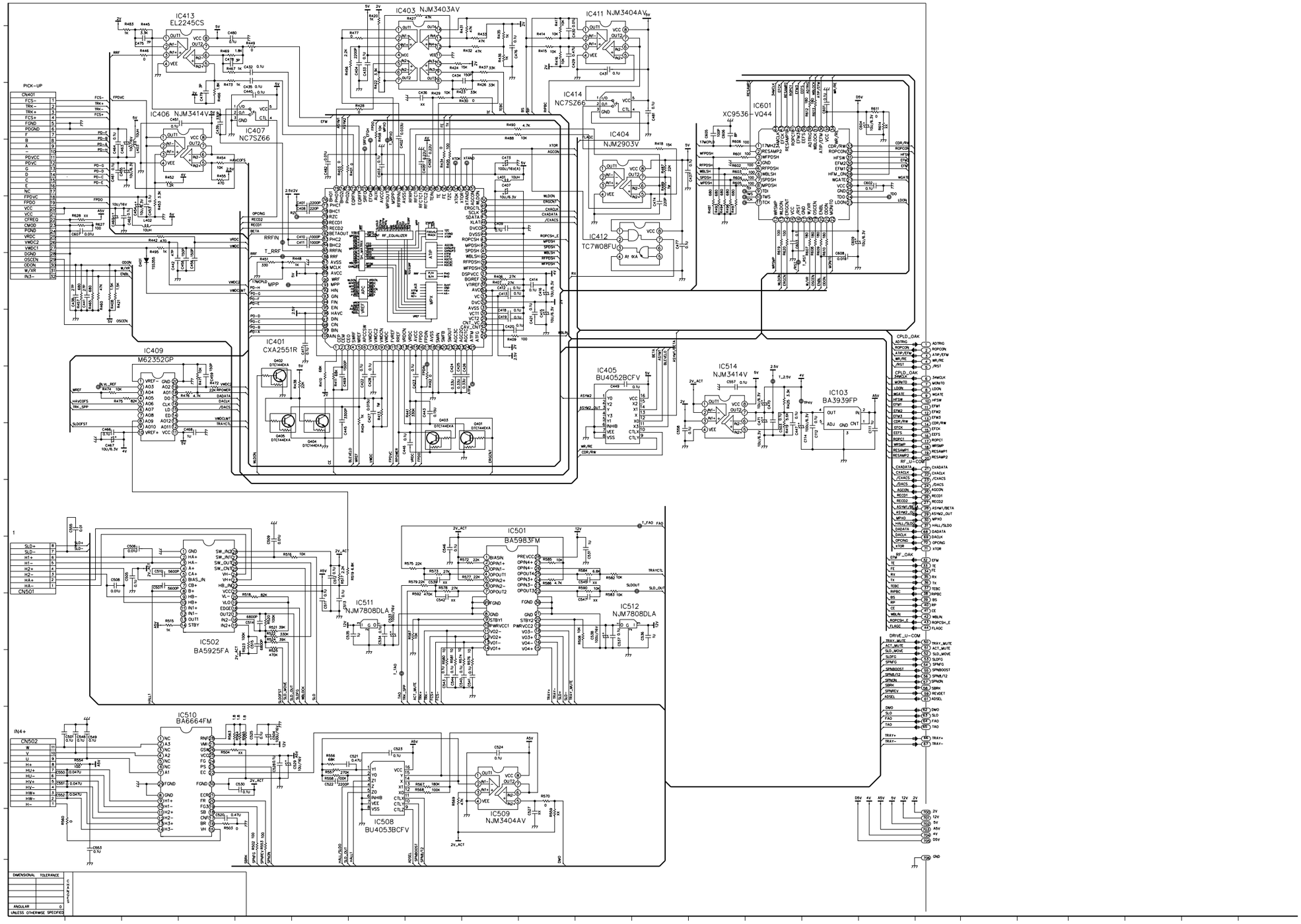
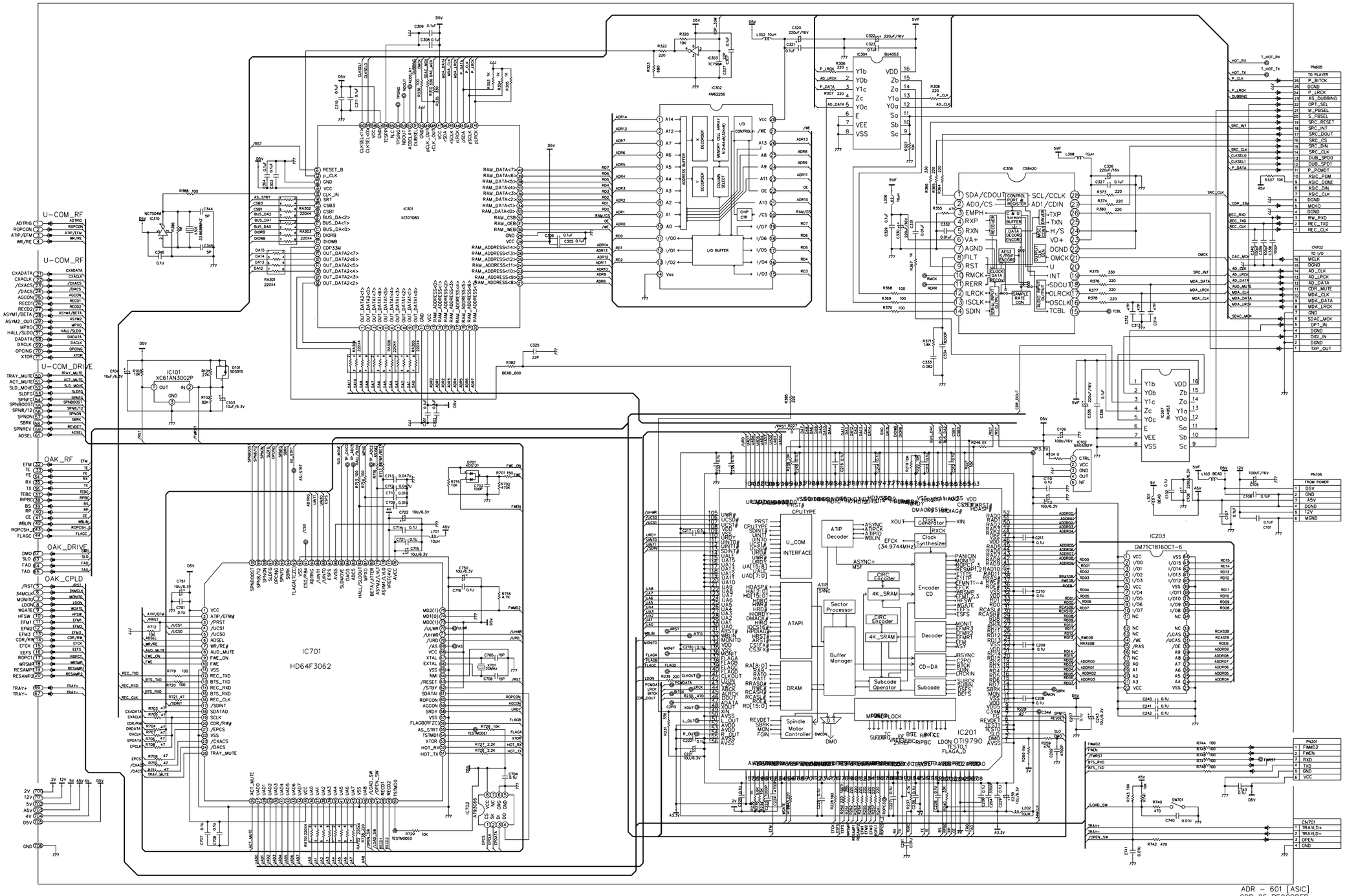
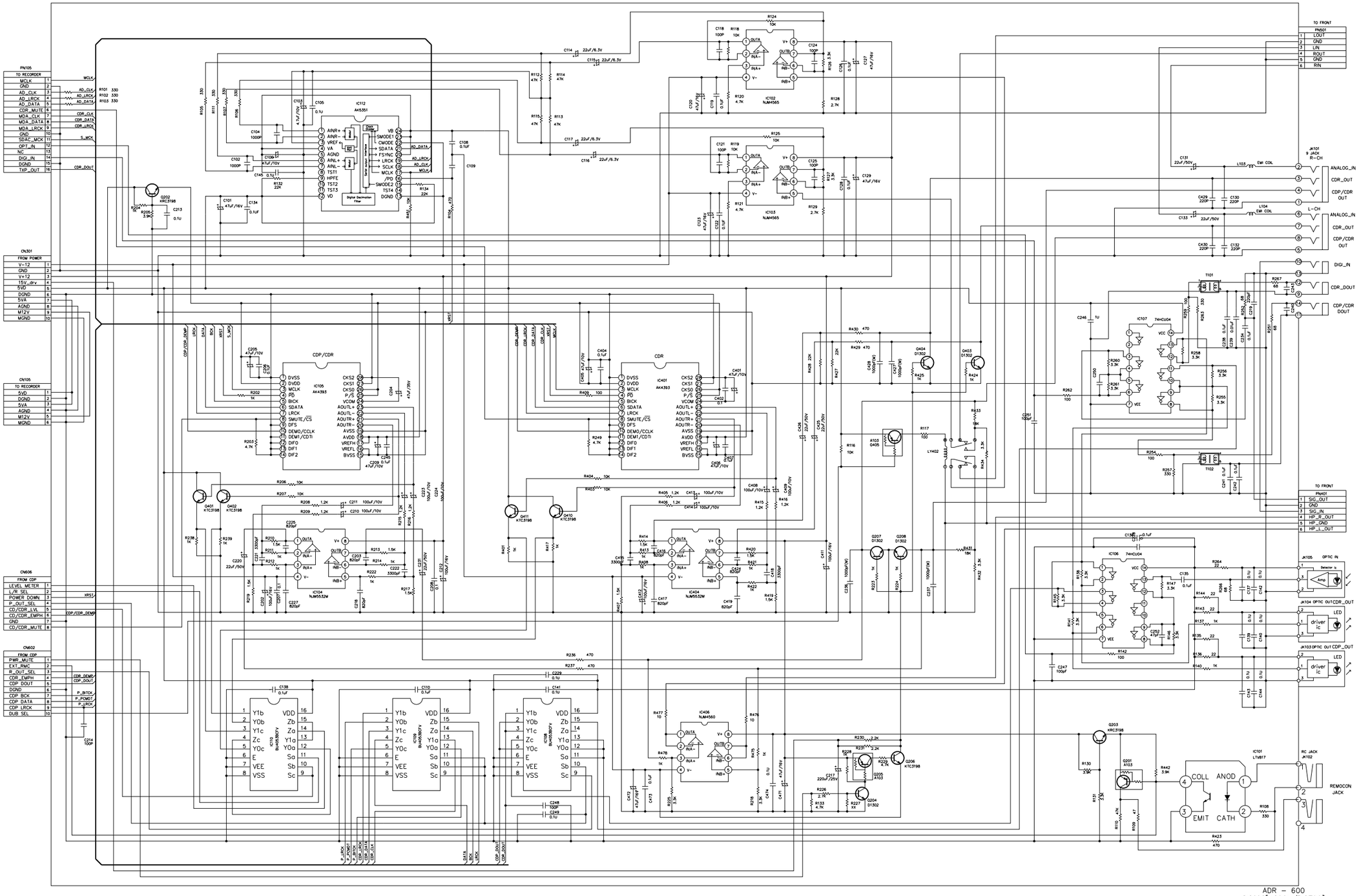
• CD-RECORD SECTION-1



• CD-RECORD SECTION-2



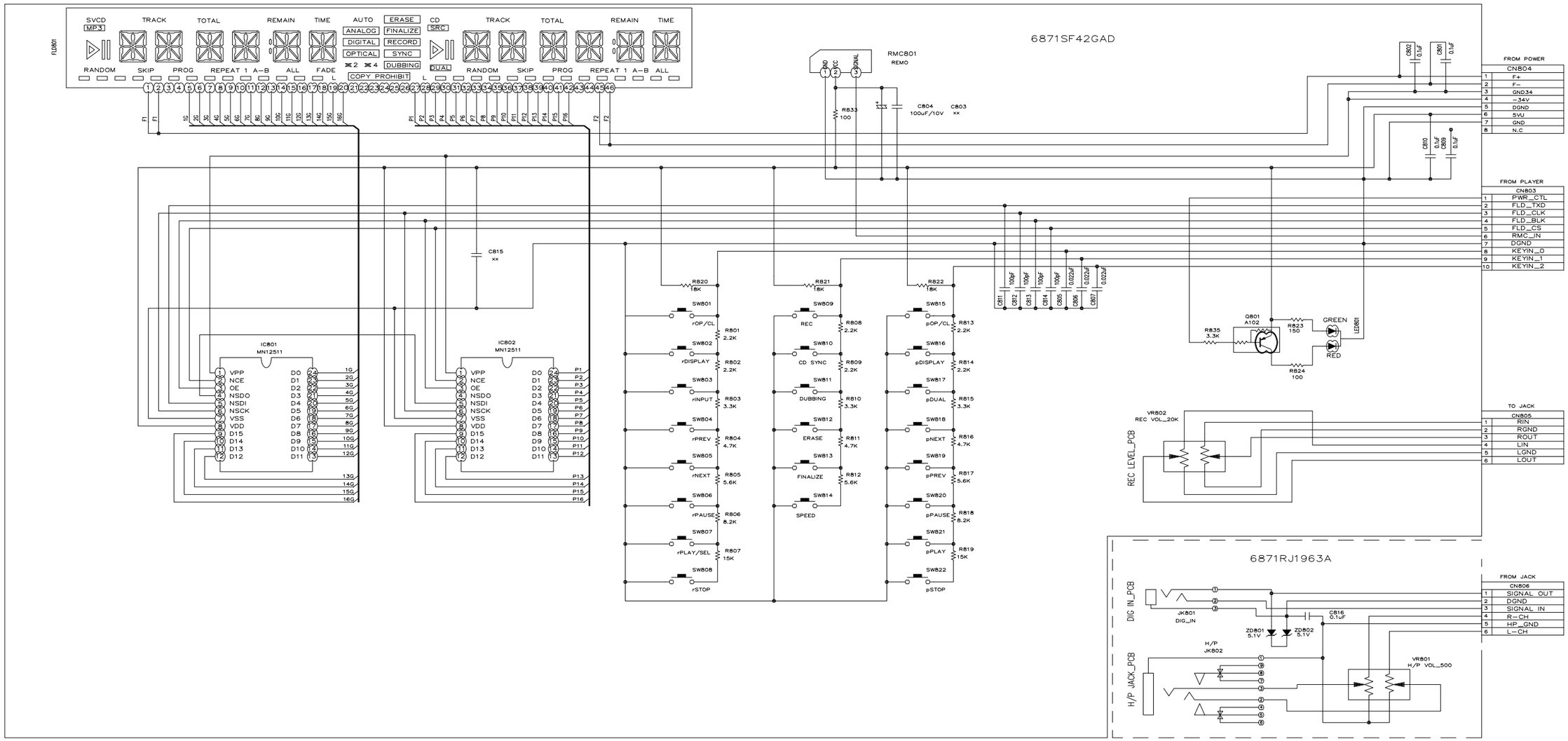
• AUDIO-SECTION



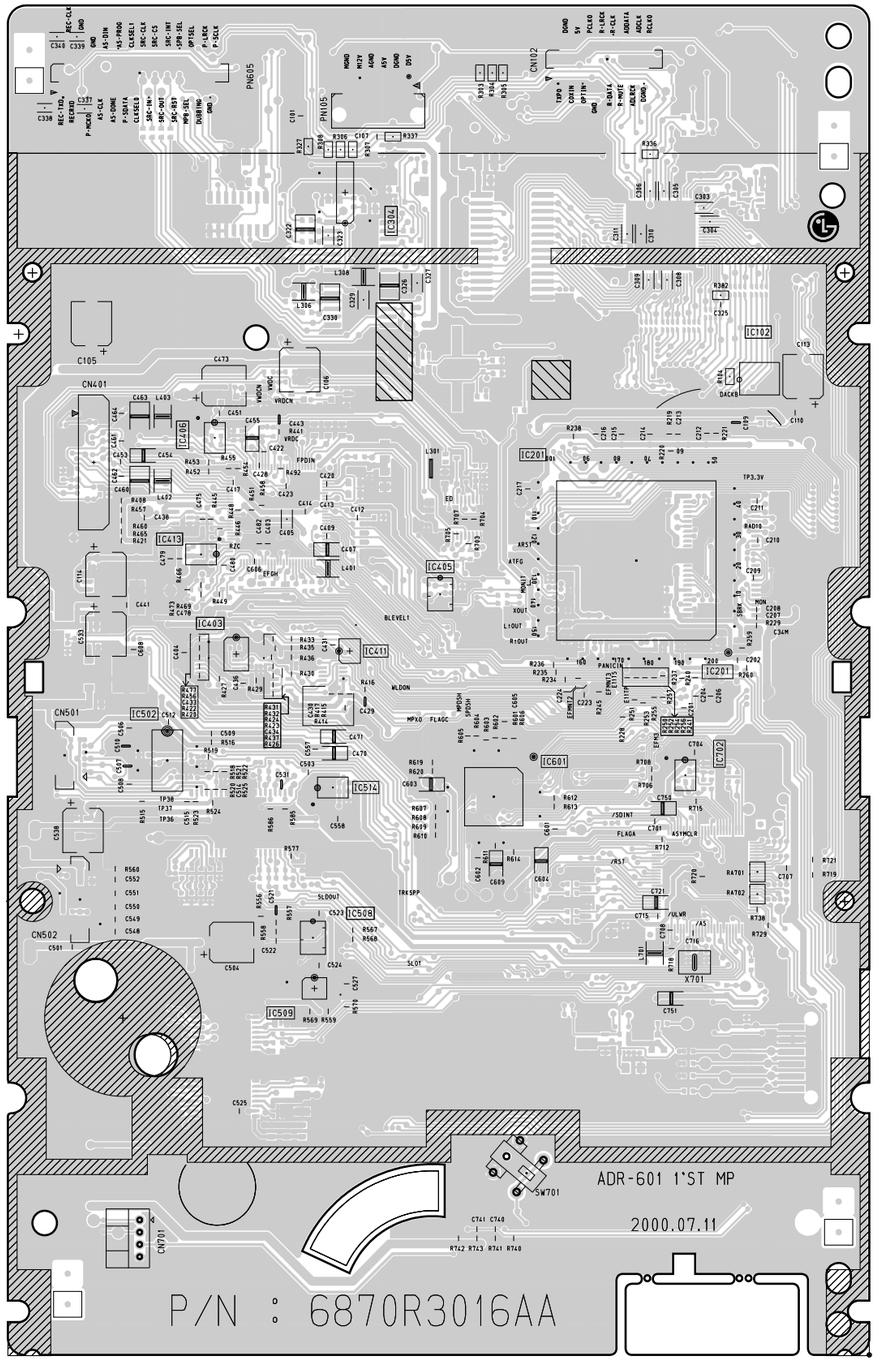
ADR – 600
SI2168[429AK/PI2790]

- -

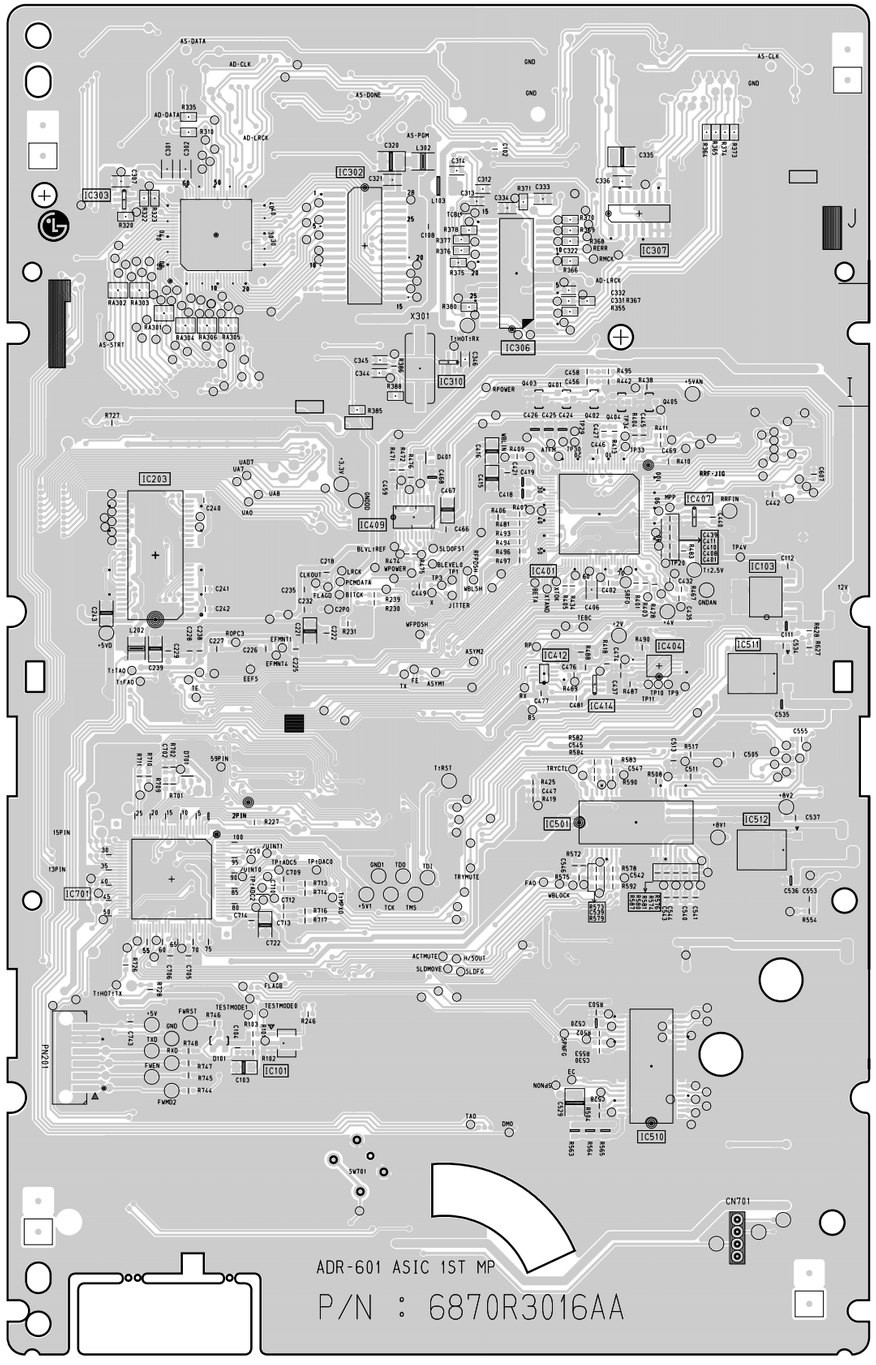
• FRONT SECTION



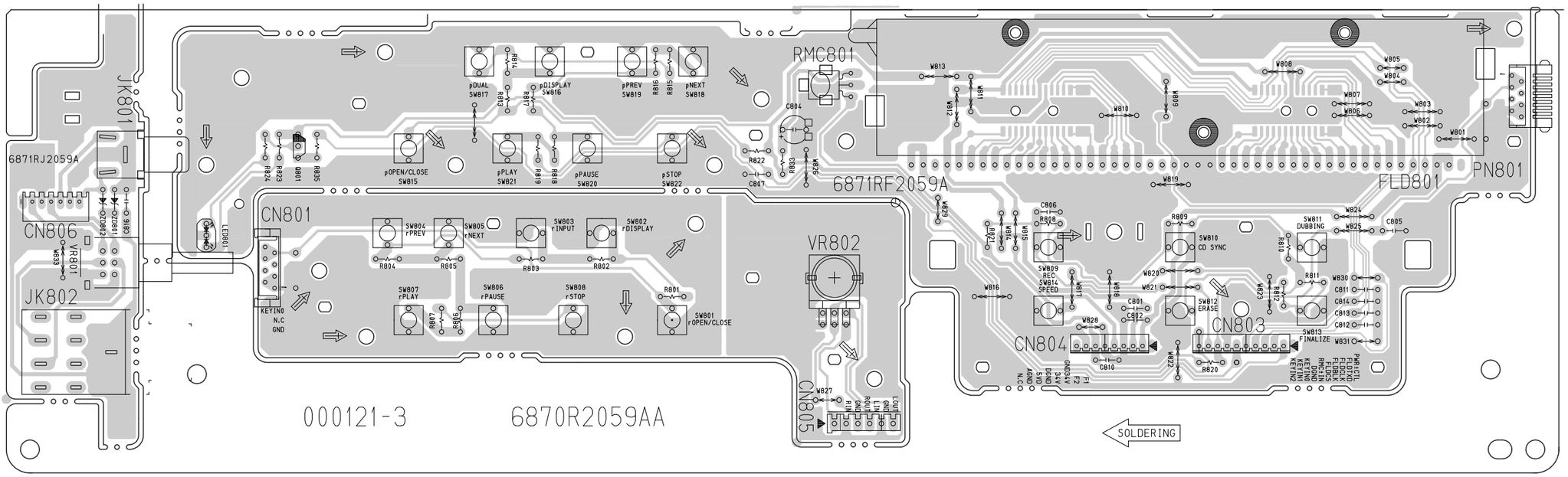
• CD-RECORD TOP SECTION



• CD-RECORD BOTTOM SECTION



• FRONT SECTION



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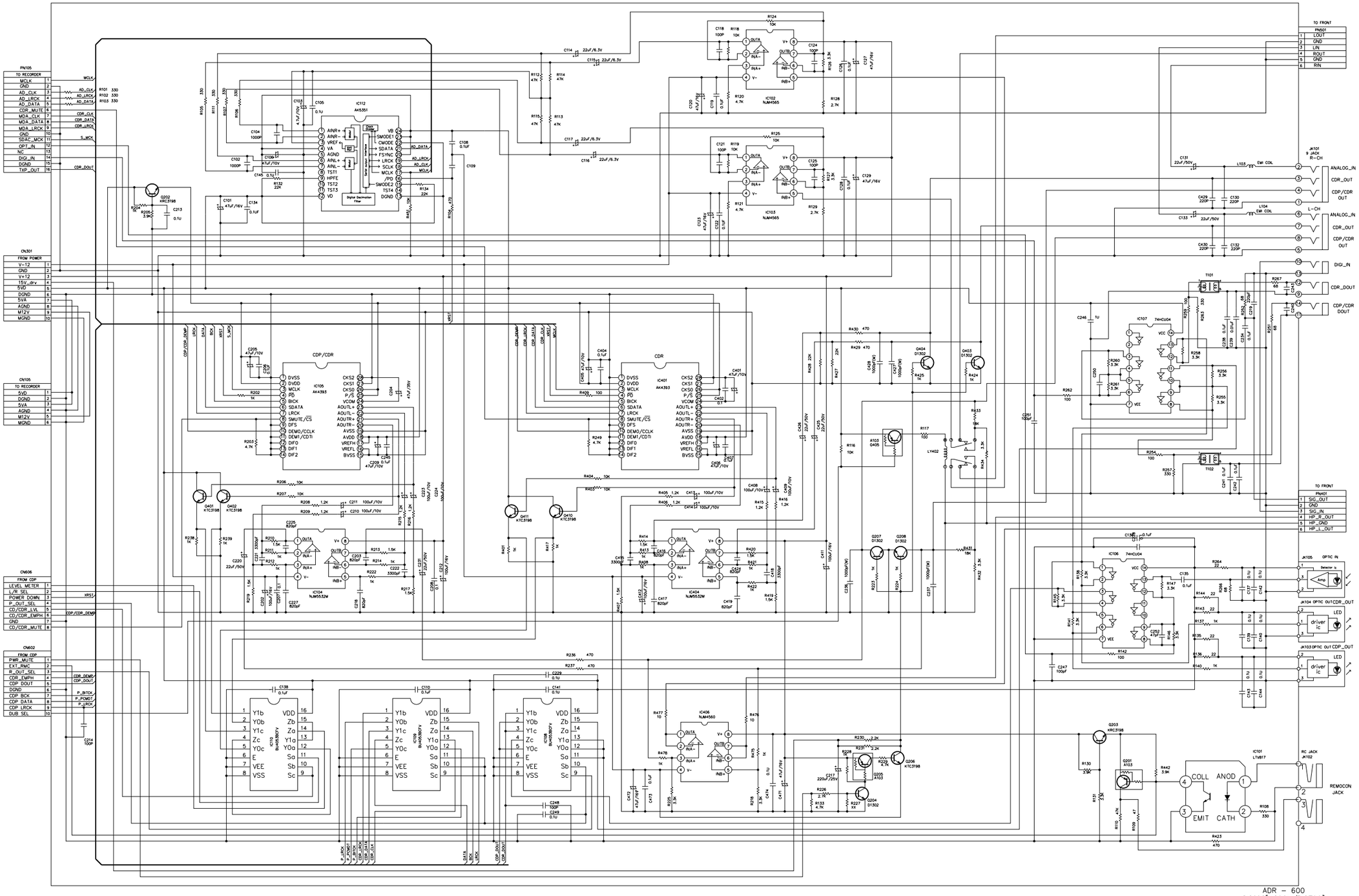
• AUDIO-SECTION

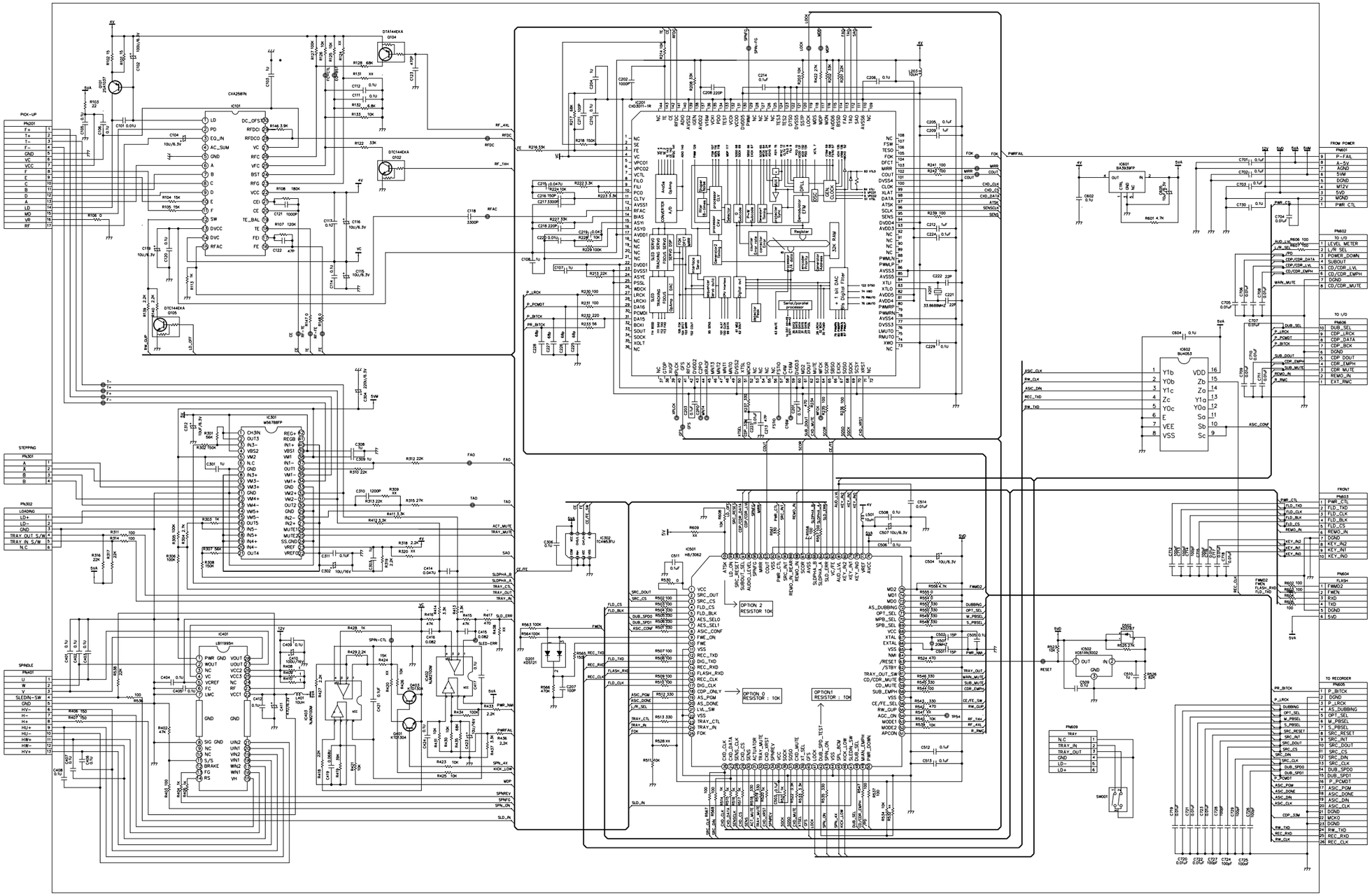


ADR – 600
SI2168[429AK/PI2790]

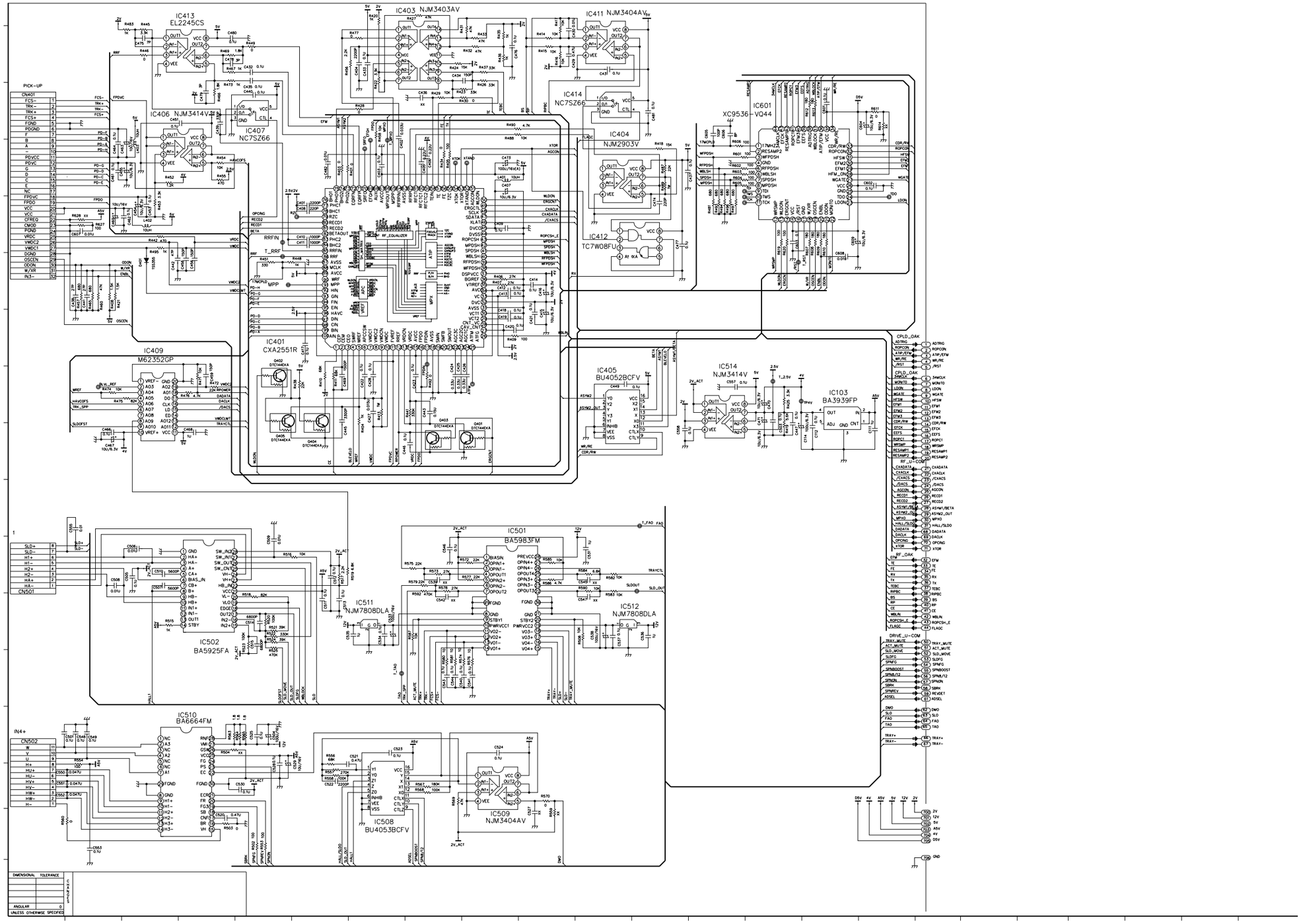
- -

SCHEMATIC DIAGRAMS

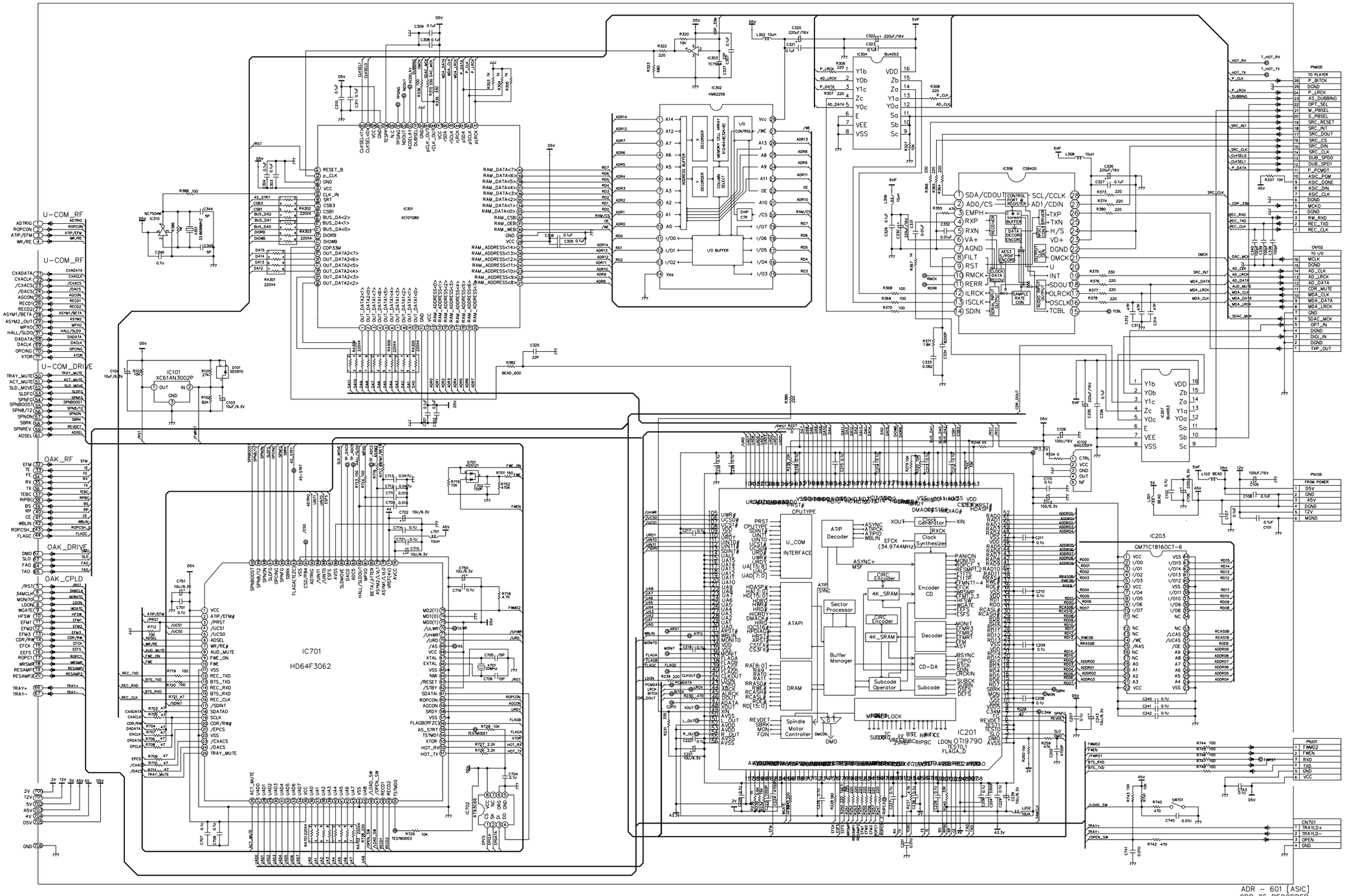
• CD-PLAY SECTION


PICK-UP
STEPPING
LOADING
SPINDLE
IC101
CXA2581N
IC301
M56788FP
IC401
LB11995H
IC501
H8/3062
IC302
IC4460FU
IC601
BA3939FP
IC602
BU4053
IC502
XC61AN3002
IC402
NJM2100M
IC403
NJM2100M
FROM POWER
FRONT
TO RECORDER
OPTION 2
RESISTOR 10K
OPTION O
RESISTOR : 10K
OPTION1
RESISTOR : 10K
32K RAM
1 bit DAC
+ 1 bit Digital Filter
Servo/parallel processor
Register
Sequencer
Digital out
Digital in
Subcode Q
Subcode P
Error correction
Clock generator
Timing generator
Interface
Servo
Focus servo
Tracking servo
Sled servo
Spindle servo
Auto sequencer
Auto adjust
Laser power control
Power ON/OFF
Defect
Mirror
Jitter
Focus search
Track jump
Speed detector
Phase comparator
Charge pump
Digital PLL
Master PLL
Slave PLL
Crystal oscillator
Divider
Error amp
Analog I/O
Sub Q
Sub P
Decoder
Frame sync
Clock gen
Timing gen
Interface
Servo

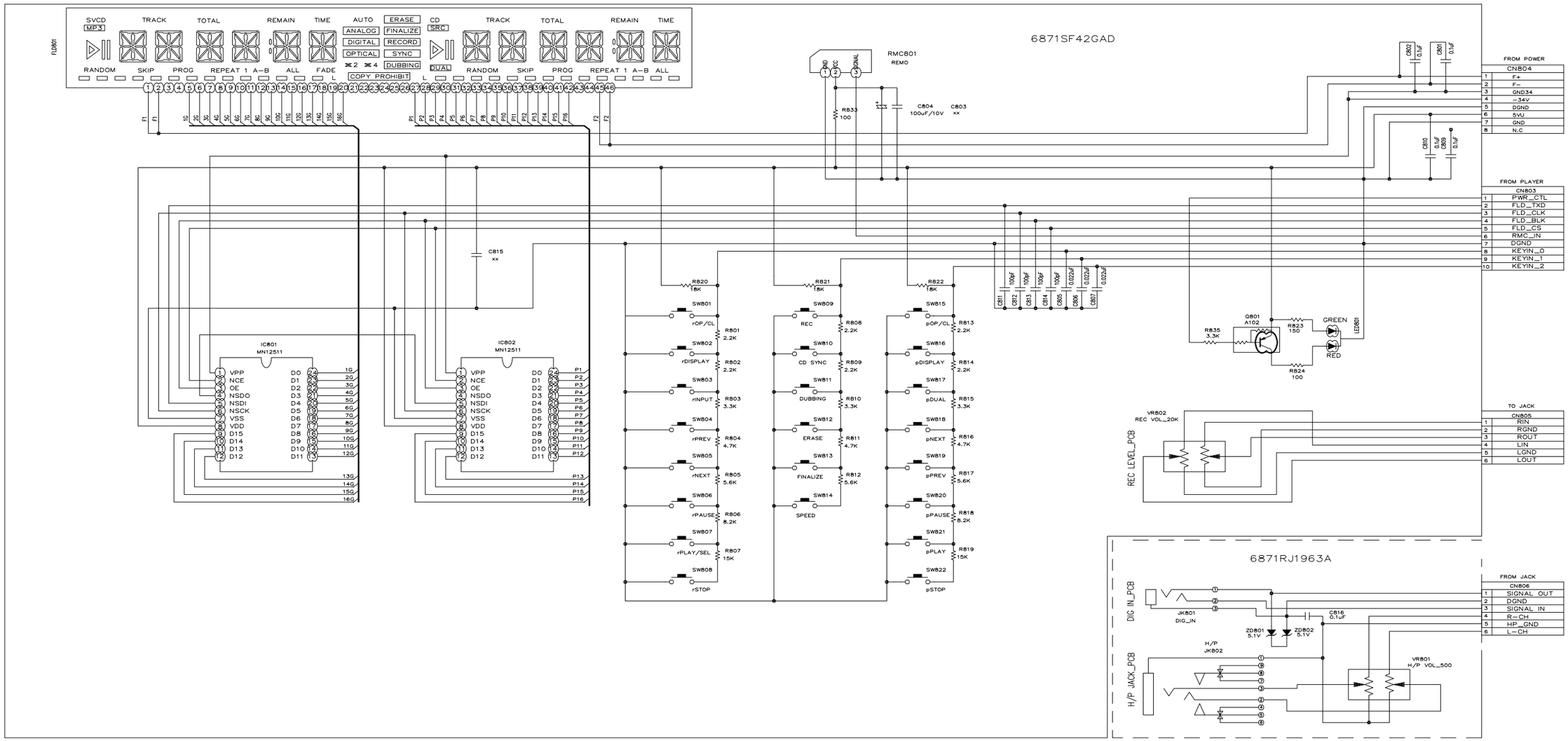
• CD-RECORD SECTION-1



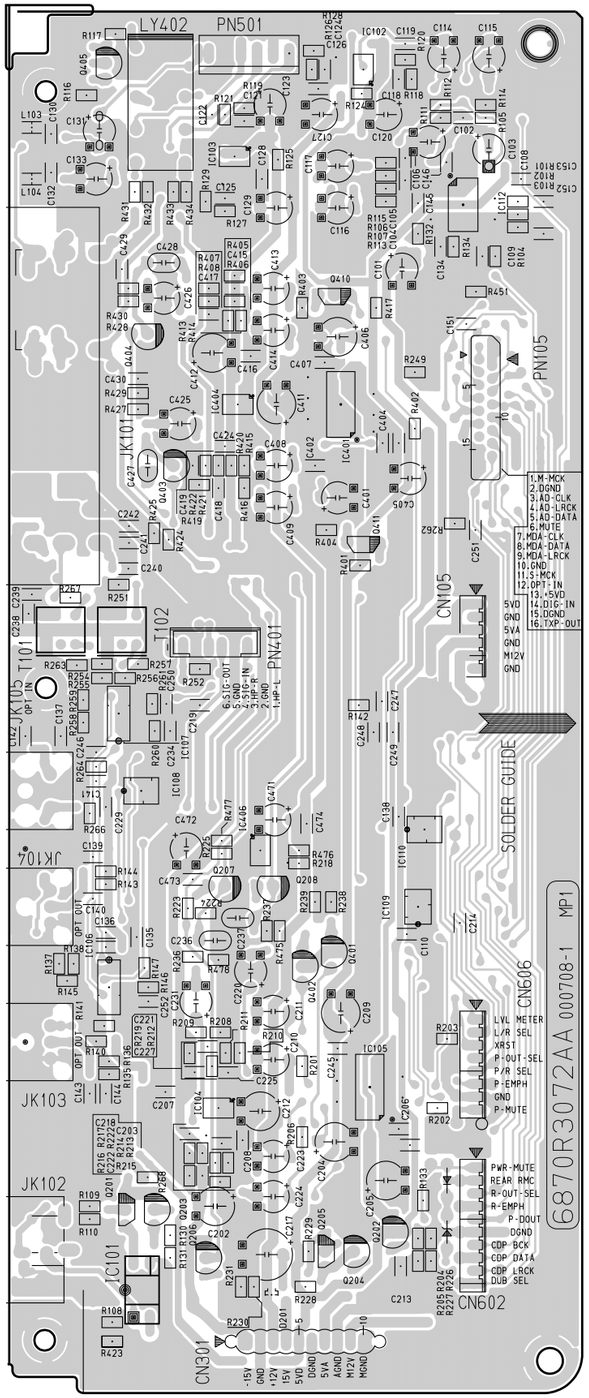
• CD-RECORD SECTION-2



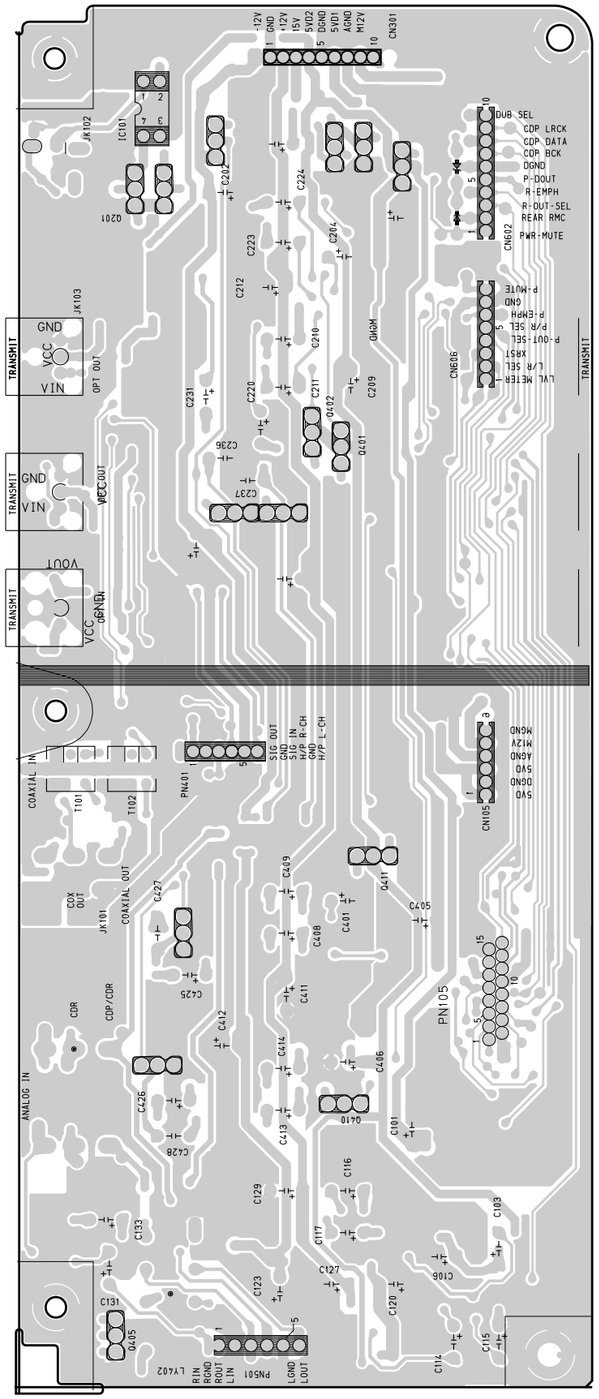
• FRONT SECTION



• AUDIO TOP SECTION

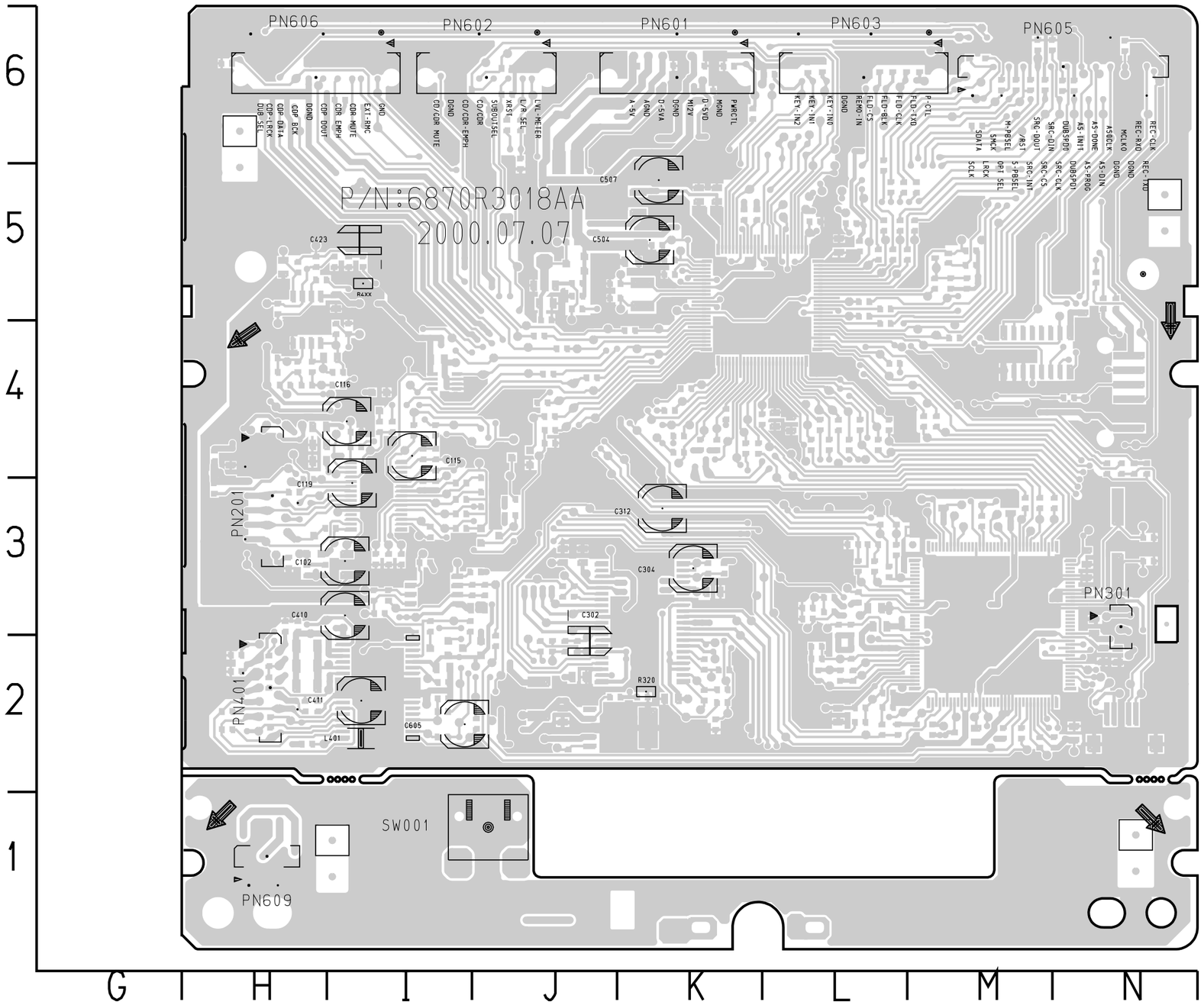


• AUDIO BOTTOM SECTION



PCB BOARD

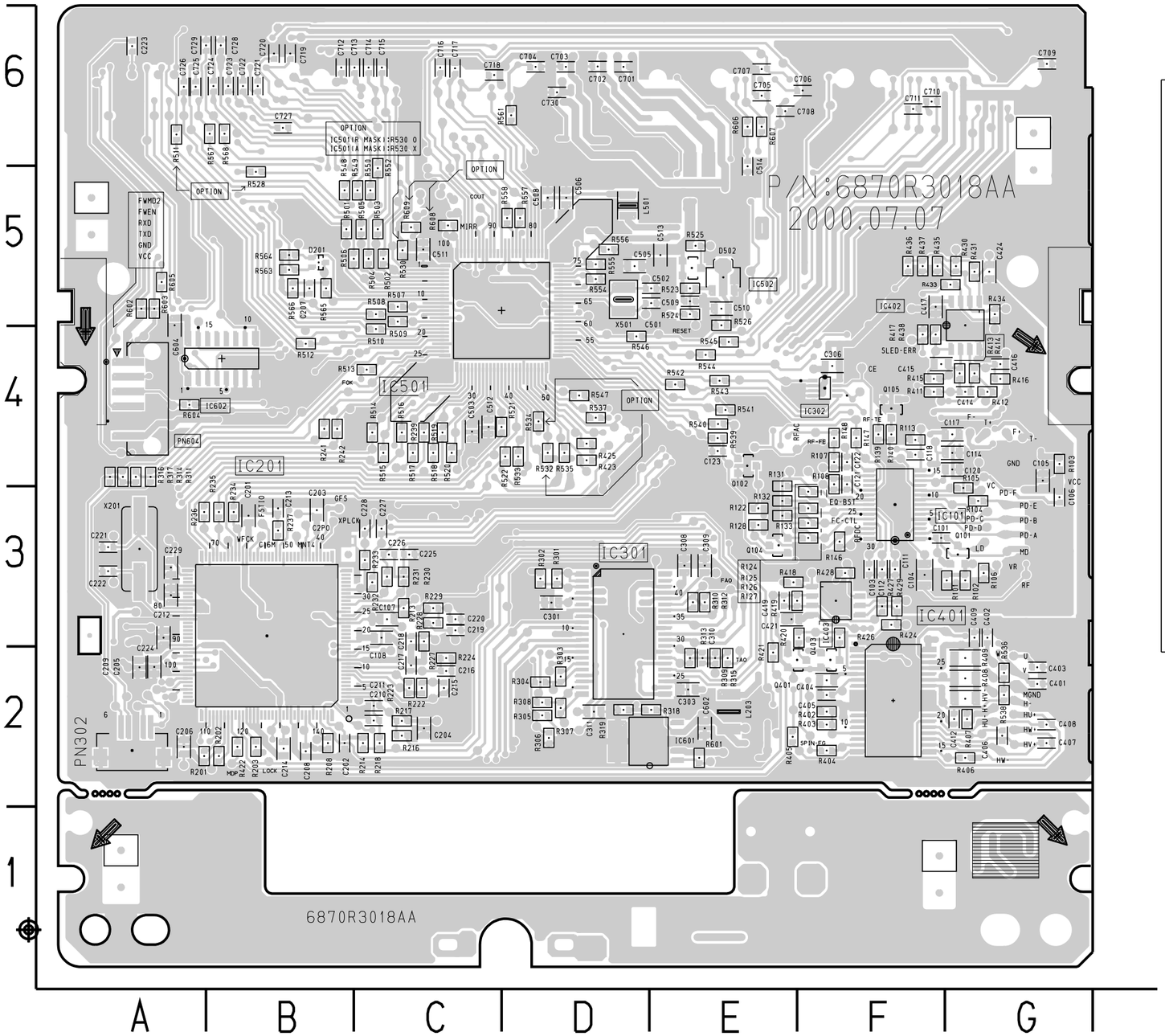
• CD-PLAY TOP SECTION



LOCATION GUIDE

C102	I3
C115	I4
C116	I4
C119	I3
C302	J2
C304	K3
C312	K3
C410	I3
C411	I2
C423	I5
C504	K5
C507	K5
C605	I2
L401	I2
PN201	H3
PN301	N3
PN401	H2
PN601	K6
PN602	J6
PN603	L6
PN605	N6
PN606	H6
PN609	H1
R320	K2
R4XX	I5
SW001	J1
TP54	N6

• CD-PLAY BOTTOM SECTION



LOCATION GUIDE

C101	F3	C227	C3	C702	D6	IC301	D3	R146	F3	R315	E2	R503	C5	R549	C5
C103	F3	C228	C3	C703	D6	IC302	F4	R147	F4	R316	A4	R504	C5	R550	C5
C104	F3	C229	A3	C704	D6	IC401	F2	R148	F4	R317	A4	R505	C5	R552	C5
C105	G4	C2PO	B3	C705	E6	IC402	G4	R201	A2	R318	E2	R506	C5	R554	D5
C106	G3	C301	D3	C706	F6	IC403	F3	R202	B2	R319	D2	R507	C5	R555	D5
C107	C3	C303	E2	C707	E6	IC501	D5	R203	B2	R402	F2	R508	C5	R556	D5
C108	C3	C306	F4	C708	E6	IC502	E5	R208	B2	R403	F2	R509	C5	R557	D5
C111	F3	C308	E3	C709	G6	IC601	E2	R213	C3	R404	F2	R510	C4	R558	D5
C112	F3	C309	E3	C710	F6	IC602	B4	R214	C2	R405	E2	R511	A6	R561	D6
C114	G4	C310	E2	C711	F6	L203	E2	R216	C2	R406	G2	R512	B4	R563	B5
C117	G4	C311	D2	C712	B6	L501	D5	R217	C2	R407	G2	R513	C4	R564	B5
C118	F4	C401	G2	C713	C6	LOCK	B2	R218	C2	R408	G2	R514	C4	R565	B5
C120	G4	C402	G3	C714	C6	MDP	B2	R222	C2	R409	G2	R515	C4	R566	B5
C121	F4	C403	G2	C715	C6	MIRR	C5	R223	C2	R410	G2	R516	C4	R567	B6
C122	F4	C404	F2	C716	C6	MNT4	B3	R224	C2	R411	F4	R517	C4	R568	B6
C123	E4	C405	F2	C717	C6	PN302	A2	R227	C3	R412	G4	R518	C4	R601	E2
C16M	B3	C406	G2	C718	C6	PN604	A4	R228	C3	R413	G4	R519	C4	R602	A5
C201	B3	C407	G2	C719	B6	Q101	G3	R229	C3	R414	G4	R520	C4	R603	A5
C202	B2	C408	G2	C720	B6	Q102	E4	R230	C3	R415	F4	R521	D4	R604	A4
C203	B3	C409	G3	C721	B6	Q104	E3	R231	C3	R416	G4	R522	D4	R605	A5
C204	C2	C412	G2	C722	B6	Q105	F4	R232	C3	R417	F4	R523	E5	R606	E6
C205	A2	C414	G4	C723	B6	Q401	F2	R233	C3	R418	E3	R524	E5	R607	E6
C206	A2	C415	F4	C724	B6	Q403	F2	R234	B3	R419	F3	R525	E5	R608	C5
C207	B5	C416	G4	C725	A6	R101	G3	R235	B3	R420	F3	R526	E4	R609	C5
C208	B2	C417	F5	C726	A6	R102	G3	R236	A3	R421	E2	R528	B5	RESET	E4
C209	A2	C419	E3	C727	B6	R103	G4	R237	B3	R422	B2	R530	C5	RF-FE	F4
C210	C2	C421	E3	C728	B6	R104	G3	R239	C4	R423	D4	R532	D4	RF-TE	F4
C211	C2	C424	G5	C729	B6	R105	G3	R241	B4	R424	F3	R533	D4	RFAC	F4
C212	A3	C501	E5	C730	D6	R106	G3	R242	B4	R425	D4	R534	D4	RFDC	F3
C213	B3	C502	E5	CE	F4	R107	F4	R301	D3	R426	F3	R535	D4	SLED-ERR	F4
C214	B2	C503	C4	COUT	C5	R108	F4	R302	D3	R427	F3	R536	G2	SPIN-CTL	F3
C215	C2	C505	D5	D201	B5	R113	F4	R303	D2	R428	F3	R537	D4	SPIN-FG	F2
C216	C2	C506	D5	D502	E5	R122	E3	R304	D2	R429	F3	R538	G2	T+	G4
C217	C2	C508	D5	EQ-BST	F3	R124	F3	R305	D2	R430	G5	R539	E4	T-	G4
C218	C3	C509	E5	F+	G4	R125	F3	R306	D2	R431	G5	R540	E4	TAO	E2
C219	C3	C510	E5	F-	G4	R126	F3	R307	D2	R433	G5	R541	E4	X201	A3
C220	C3	C511	C5	FAO	E3	R127	F3	R308	D2	R434	G5	R542	E4	X501	D5
C221	A3	C512	C4	FC-CTL	F3	R128	E3	R309	E2	R435	F5	R543	E4	XPLCK	B3
C222	A3	C513	E5	FOK	B4	R131	E3	R310	E3	R436	F5	R544	E4		
C223	A6	C514	E5	FSTIO	B3	R132	E3	R311	A4	R437	F5	R545	E4		
C224	A3	C602	E2	GFS	B3	R133	E3	R312	E3	R438	F4	R546	D4		
C225	C3	C604	A4	IC101	F3	R139	F4	R313	E2	R501	B5	R547	D4		
C226	C3	C701	D6	IC201	B3	R140	F4	R314	A4	R502	C5	R548	B5		